MODERN IDEAL HOMES FOR INDIA

By

R.S. DESHPANDE

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FOREWORD

By Sir M. Visvesvaraya, Kt., K.C.I.E.

Housing is one of the three or four prime necessities of life and house building is the oldest of Indian arts. As changes are taking place in the habits and standards of living of our people and new structural materials are coming into use, an up-to-date book on house design and house planning comes as a timely addition to our scanty technical information in this country.

The book gives a large variety of plans and views to suit all tastes and purses. The author, Mr. R. S. Deshpande, had, before writing it, equipped himself for the task, first by extensive practice in building Indian homes, and later, by travelling in Western countries and Japan to study modern house-building technique in those countries.

The book should prove a welcome guide both to persons anxious to secure comfortable and attractive homes at moderate cost, as well as to contractors, co-operative societies and other agencies interested in house-building projects on a large scale.

M. Visvesvaraya

F O R E W O R D

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PREFACE TO THE FIRST EDITION

THE very cordial reception acorded by the public to both my English publications *Residential Buildings Suited to India,* and *Cheap and Healthy Homes for the Middle Classes,* has ecouraged me to compile the present volume. It was originally intended to ling out a revised edition of *Residential Buildings Suited to India,* which has long since, been out of print, and a start was actually made with that view inmind. But, on account of the very common use of concrete in building corruction, and the advent of a number of new materials, since the publication f that book in 1931, not only have the domestic architecture and also buildg methods been revolutionized, but even our very ideas of living have underge a considerable change. Then again, in the course of travels round the wor in 1936-37, to study the contemporary architecture and building practice, picked up a number of new ideas, which were to be incorporated in the pret volume. The result has been that, except for the introduction and two three chapters (to which, also, a number of important new additions have en made), there is nothing in common with the old book. Most of the pl, in particular, are new and designed to illustrate the principles enunciatin the book. In order to bring out a variety, a few plans, designed by ofessional architects of outstanding reputation, are also added with photaphs of their elevations. The descriptive notes are so arranged that they just opposite the plans commented upon. I hope this facility in reference be appreciated.

I must acknowledge thelp I received in the compilation of this volume from my friends, too ierous to mention here, by way of either encouragement, suggestions or lng of plans of their homes. Among them I must express my gratitude tr. B. B. Kamat for his ever-willing, very valuable help and encourageme

A special mention of ndebtedness must be made to the worthy architects, whose plans have treproduced in the book. Their names have been invariably mentioned bethose plans.

R. S. D.

November 1939

Preface to the Second Edition

THE writer acknowledges with gratefulness the warm reception accorded by the public to the first edition of this book, and the kind sentiments of appreciation expressed by a very large number of them.

Innumerable small additions have been made, here and there, throughout the book in this edition. The large ones, which deserve mention, are those to the chapters on Modern Architecture, Furniture and Furnishing, and Landscape Gardening. An altogether new chapter on artificial lighting has been introduced. A few plans of doubtful merit have been scrapped and replaced by new and better ones, and about twenty more plans have been added to the previous number. An attempt has been specially made to bring out a variety by selecting them from the designs of a number of different prominent architects whose names have been mentioned below the plans.

The writer takes this opportunity of acknowledging the courtesy of the owners, architects and contractors who very kindly gave permission to reproduce the plans and photographs.

Poona
October 1943

R. S. D.

Preface to the Fourth Edition

THE author is deeply indebted to the public for the very enthusiastic reception which they continued to give to the book, which has resulted in this fourth edition being produced within two years.

Apart from the several minor alterations here and there made in this edition, a number of plans in the former edition have been replaced by an equal number of new ones representing the latest trend of design in this country to suit the altered conditions created by the aftermath of the War, the Independence and Partition, and the distress which followed in its wake by the greatest migration of people in the history of the world.

Poona,
August 1948.

R. S. D.

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INTRODUCTION

To BUILD a home is a primary instinct to be found throughout the whole animal kingdom. Rats and moles dig holes underground. Ants build up ant-hills; birds build their nests—some of them with such ingenuity as would cause even the 20th century architect to blush. The mathematical accuracy and the sense of economy displayed by bees in the cells of a honeycomb are indeed remarkable.

Man himself is no exception to this manifestation of the primary instinct to build, in spite of the boast that he stands high above the level of other animals. One has merely to watch his activities in childhood—the period he stands farthest from the "civilised man" he loves to term himself. Whenever children play under a roof or on the sands, their most pleasant occupation will be found to be to "make a house" or to "play at keeping house" with all sorts of improvised materials and make-beliefs. Recall, dear reader, the faint memories of your childhood and verify for yourself the truth about this building instinct even in man.

In India particularly, this instinct is sanctified by usage. It is the peculiar trait of the Indian mind to look upon the ancestral home with a certain degree of sanctity. If he inherits none, he must either build or acquire one. With him "no home" is "no status." The status and the respectability of a man is largely gauged by his possession of a house to live in. Mere wealth, however immense, does not give him that status in society which even a man of slender means can command if he owns a humble cottage. So strong is this sentiment that people of all grades and professions—merchants, lawyers, doctors—love to invest their savings, even though meagre, in building or acquiring a house, in spite of the fact that the prospects of a return may not be so bright as in other forms of investment.

Yet, it is a pity that very few people give the necessary thought and attention which a matter of so vital importance deserves. Except in a few cities in which Municipal or Executive Authorities compel the owners by law to submit the plans of proposed buildings, no one ever attempts to do so; and even in the case of the plans submitted, they merely satisfy the Municipal requirements.

This apathy towards our seeking systematic, scientific advice must, however, disappear. Of recent years, there has been a marked tendency among people to purchase a small plot of land on the outskirts of a city or town and to build on it one's own cottage in preference to dwelling in dingy, stuffy, old, rented houses in the urban area. This is no doubt a hopeful sign; but

what usually happens is that the overflowing enthusiasm of people prompts them to try their own hand at planning without the necessary knowledge, discrimination and experience, which the importance of the work demands. No plan is drawn, no estimate is framed. Sometimes the building work is started even without the necessary funds at the owner's disposal. The work of construction is entirely left to the mercy of the quasi-literate *maistry* or illiterate carpenter, or to a class of contractors hardly equipped with any systematic training in their craft. Most of the latter usually belong to the same category of people as *maistries* and masons, but have risen to a slightly higher level due to some turn of good fortune. Most of them, however, are generally equally incapable, more or less, to grasp properly the ideas of a decent living and to provide for the arrangements and comforts which a cultured man, with a delicate and refined sense, demands. To add to the confusion, friends pay kind visits and dole out suggestions while the building work is in progress. These suggestions are made with the best of intentions, but by people equipped with nothing better than sheer ignorance of technicalities: "Nine feet floor height makes the building look ugly; it should be at least 11 feet. Mr. So-and-So's bungalow looks like a palace with that height. Such things are done once in a lifetime. Don't spoil your bungalow for the sake of a few rupees," and so on. These "few rupees," expended on so many items, go to swell the cost by 50 per cent, which the owner does not then realise. But when the time for payment comes, his eyes are opened, his enthusiasm gets a rude shock, and more often than not, the property falls into the hands of the creditor! Apart from the "inflated" cost which is the inevitable result of such a procedure, the house, or rather the "masonry box," with a tiled lid affording protection from the sun and wind—(not to say "from rain," because the roofs of such houses are often hospitable enough to welcome rain inside)—fetches very little value in the market when offered for sale.

There is only one way of evading such a catastrophe, viz., to get a suitable plan drawn and a complete estimate framed with the help of some architect who knows his job well. It is a "penny-wise-and-pound-foolish" policy to grudge spending a trifling amount for this very important matter. The preliminary design may be made by the owner to indicate his special requirements to the architect, but beyond that it is advisable to leave the details to the architect's tried and mature judgment. Still, on the other hand, howsoever clever and expert an architect may be, it is impossible for him to gauge correctly the peculiar requirements, the likes and dislikes, the prejudices and idiosyncrasies of his client. I have come across some doctors and professors who have distinguished themselves in their own lines but have exhibited gross ignorance of even the correct idea of dimensions. An average person, if he but

takes a keen interest and approaches the subject in a spirit of determination to study and choose the best, can easily master the art of house-planning in a short time. He should begin first measuring with a tape the dimensions of the rooms he is occupying, the doors, windows and all other details, so that he can at once determine his choice of the sizes which would exactly suit him. The next lesson is to actually visit a few typical houses of his friends and note the conveniences or otherwise experienced by them for his guidance.

A practical hint, in this connection, would, I hope, not be considered out of place here. If the house, which is going to be built, is calculated to give happiness to the family, one must take counsel of the partner of his life's happiness in respect of its planning. We give the lady of the house the high-sounding title of *Grihini* or *Griha-Lakshmi,* i.e. "Mistress of the house," or "the presiding deity of the house," and still, we do not consult her even in respect of the kitchen arrangements with which she alone is concerned. It is a mistake to suppose that a woman cannot understand these things. On the contrary, the term "better-half," given to her, proves itself to be literally true in this respect. Ladies are very quick at perceiving the conveniences and the inconveniences of living in a house. That is *par excellence* their sphere of life. Measured in hours, they live in the house more than we do. You will be surprised to find what an amount of common sense your wife will show in criticising the plan of a house and making suggestions in respect of conveniences, delicacies and refinements of arrangements which we, of sterner sex, would scarcely think of.

Very direful is the result of this obvious omission. Its bitter experience comes to the lot of the unfortunate house-owner. Soon after the eventful day which he had so eagerly been longing to see, viz., the day on which the palatial building of his proud ownership is first occupied, he is constantly heckled by sarcastic criticism by day and dread curtain lectures by night, such as, "The bathroom is too small"; "the staircase should have been in that place"; "the sink should have been in that corner"; "the smoke outlet does not work"; "there is absolutely no seclusion for worship or offering prayers in the whole house"; and so on. His eyes are now opened, his pride of possession melts away, his enthusiasm is crushed, the fool's paradise crumbles to the ground and he finds his life not worth living; and though the inner sense of his vanity would not allow him to own defeat and frankly apologize, he repents for his folly in not having allowed his "better-half" a part in the counsel which would have at least saved him from such searching criticism.

What does good planning exactly connote? When is a house said to be well designed? The answer is not far to seek. A house designed economically, which preserves the health of the inmates and adds to the comfort and

happiness of the family may be said to be well designed. A good house must exactly suit the family, just as clothes do the wearer. The external embellishment, the overflowing, elaborate architectural features contribute very little towards making a house comfortable. The value of a house designed for comfort will certainly be enhanced if it synchronises with external beauty. But a house, with the best exterior, may be found to be a failure as an investment when compared with a cosy, plain-looking cottage solely designed for convenience and comfort.

When we look all around us, we find that there is a general tendency, which is increasing every day, for people to leave healthy villages and flock to industrial centres in crowded cities. This exodus has been caused by a good many deep-rooted causes, mostly economic, such as poverty, agricultural depression, lack of educational, banking, marketing and medical facilities, habits of uneconomical living, attractions of city pleasures and enjoyments, and so on. This has resulted in creating a dearth of houses both in towns and villages—in towns because there is a house-famine and in villages because the houses which are deserted crumble to the ground for want of care. The evil consequences of the house-famine which has affected every grade of society living in towns, are the inflation of rent and over-crowding of rooms, of which the latter brings in its train high death-rate, especially amongst infants, mental restlessness, physical weakness, lung diseases, and the lowering of general vitality, etc.

The abnormal rise in the cost of foodstuffs and clothing on account of the outbreak of World War I, added fuel to the fire and made the position of the middle and lower classes still worse, in spite of the Rent Act, which came to their assistance for some time at Bombay and some other places, and gave them some relief. They could not help submitting to the unreasonable demands of their landlords. But after some time, when the prices of foodstuffs and clothing showed some improvement, they were prepared to take every opportunity of throwing off the yoke and be independent of their landlords by trying to build small cottages on the outskirts of towns. The Co-operative Societies' movement, inaugurated by Government, promoted their efforts by offering them loans at low interest, if they formed themselves into a registered Society. The efforts of the Development Department, Bombay, further stimulated them by offering concrete examples of cheap dwellings, and it is now a hopeful sign of the times that people have realised that, instead of paying abnormal rents and living in the midst of unnatural conditions, they could, with a loan raised from a bank or a Society, build, in the midst of healthy surroundings, cottages according to their own choice which would ultimately become their own if they paid monthly instalments for a fixed period, instead of

monthly rents. It is very satisfactory that a number of Co-operative Housing Societies are fast springing up.

While endeavouring to promote one such Society, viz., the Saraswat Brahmin Colony, in Poona, of which I have the privilege of being one of the prime organisers, I had a unique opportunity of studying the problem at first hand and realising the difficulties which confront the laymen, who, for want of facilities, have to design their own houses and entrust the construction to the semi-literate *maistry*. I very much deplored this state of affairs and resolved to try to relieve the situation partially by (1) writing practical notes, preferably in vernacular, on building construction in a manner easily intelligible to the lay mind and (2) publishing a few typical plans of cottages suitable for Indian climate and social customs. The former took the shape of a book in Marathi which has been very enthusiastically received by the public and, I am glad to state, is translated into other important vernaculars of India.* The present volume is the result of my attempt to carry out the latter part of my determination.

The first book, viz., *Residential Buildings Suited to India* appeared in 1931. Therein I had sought to deal mainly with plans of buildings, of which nearly ninety different specimens were given, and in the 100 pages preceding them, the principles underlying the scientific planning of domestic buildings were described; no attempt was made to deal with construction, nor with architecture. In respect of construction, the reader was referred to my practical treatise on Building Construction mentioned above, while, in respect of architecture, ideas were suggested by way of a variety of elevations, though of a conventional character.

Ideas, however, have undergone a considerable change since then, not only in point of architecture, but also in the designing of the interior of domestic buildings and furniture. This was brought about by the advent of novel building materials and new inventions. Then again, the manufacture of indigenous cement of excellent quality on a mass scale and its efficient distribution and sale at a cheap rate by the Cement Marketing Company of India, coupled with the excellent facilities of transport offered by the rapidly increasing motor traffic—all these have brought ferro-concrete construction to the forefront even in remote corners of the country during the past few years.

Side by side with this, the undercurrents of a change in domestic architecture, almost revolutionary in character, swept over all the Western countries; and how could India escape them? They were shot up by the leaders of different schools of architecture such as Le Corbusier in France,

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*_Sulabh Vastu Shastra_ or "Modern Homes and How to Build Them." Marathi 3rd edition Rs. 6/8; Hindi and Gujarati Rs. 4/-. Also available in English under the title, *Build Your Own Home*.

Gropius in Germany, Oud in Holland and others in other countries, who rose in revolt against the traditional architecture. They dubbed it as "dishonest expression of academical falsehood" and shouted slogans to run it down:

"The so-called '*architecture*' does not exist; only '*functions*' exist"

"The house is a machine to live in"

"The house must prove a good merchandise"

and so on and so forth.

There, again, came the theory of "Russian Constructivism," with the boldest and most revolutionary architectural designs with steel and glass and based on rigorous mathematics.

I must confess I was taken off my feet by the merciless logic with which they expressed their astounding views which filtered to this country through books and articles in Western journals. Some of them were apparently so contradictory to each other that it was impossible to reconcile them. The result was that they left an impression of universal chaos and incoherence—a conglomeration of fanciful ideas. This urged me to seek, if possible, a first-hand knowledge of modern architecture and the current practice of building homes in the civilised countries of the world. That is how my round-the-world tour of 1936-37 started.

I could hardly spare more than eight months for this purpose, still I made the most of the opportunities during this short period. Not only could I see and study contemporary architecture in the different civilised countries, but I was also lucky enough to interview some of the great architects and ascertain their views. As a result, I was convinced that it was not a revolution which was sweeping over the Western countries, but a natural, inevitable evolution; that the various seemingly antagonistic theories propounded in the wordy battles were but different solutions emphatically put forward, and that only what was sound and durable both in theory and practice came to stay permanently.

After my return from this world tour, I laboured for over a year in giving shape to the ideas picked up abroad with a view to "Indianising" them, i.e. to adapt or modify them to suit the climatic conditions and social customs of the people of this country. The reader will see that not only a number of new ideas have been introduced and added to the notes, but that most of the plans in the previous book have been replaced by altogether new ones, with plain, simple, cheap, but nevertheless, more artistic elevations. They embody all the best features, not only of the American, English, German, Danish, Swiss, French, etc. domestic designs, but also of the Japanese, which could possibly be adapted to a tropical country like ours.

Before I conclude, a word by way of explanation of the figures of costs quoted in the book would not be out of place. The cost must necessarily vary from town to town and from province to province. It must also vary with the material and fittings used. For working the figures out, a few typical estimates of each class of building were framed with the rates of materials and labour obtaining at Poona in 1939 just before the war broke out. The rate per square foot of plinth area thus arrived at has been taken as a basis for working out the costs. To them, some constant figures were added, where necessary, for special features, such as bay windows, nooks, turrets, projections, etc. They *do not* include costs of site, nor of fencing, drains, electric fittings, etc. I hope that they will serve as a rough guide, at least, for any particular plan, and a sure and reliable guide in comparing one design with another in respect of cost.

Although it is long since hostilities ceased, economic conditions of the world have not been so far stabilised. India is no exception to this. The prices of building materials have been so widely fluctuating that it is impossible, at the present moment, to quote figures of costs. The pre-war costs have, therefore, been retained.

1
ROUGH COST

WHEN the layman has decided upon the length and breadth of the house to suit his requirements, as set forth in the introduction, the next question which confronts him is to find the approximate cost and see how it suits his purse. Very often the *maistry,* whose help he seeks, has either got no clear idea about it or, in his attempt to please his prospective client, he intentionally quotes a low figure. And, when the actual construction ultimately costs him double the amount, he blames the *maistry,* but the latter escapes all responsibility saying that the additions and alterations subsequently made by him (the owner) are responsible for the increased cost, and that, therefore, no blame attaches itself to him. Though this may be partially true, it is not wholly so. The owner now realises how he was befooled. In order, therefore, to save oneself from such a calamity, it is absolutely necessary that there should be some rough and ready rule to find out at once what a particular-sized house is going to cost, or what size of house one can build within the amount which one can afford to spend. The following rule will serve that purpose very well:

Multiply together the length and breadth of the plinth (both in ft.) and find out the plinth area of the house. Multiply this by one of the rates given below according to the character of the structure specified opposite to them.

Note: The rate per square foot of plinth area mainly depends, amongst many factors, upon the cost of labour and materials and may vary slightly according to the locality and market fluctuations. Those, given below, have been worked out for conditions obtaining in Poona in 1939. In big cities cement and hardware materials and skilled labour are cheap, but unskilled labour is costlier than in the rural districts. For an ordinary building, the cost on account of labour is roughly 35 per cent and that on account of materials, 65 per cent. Out of the 35 per cent required for labour, 49 per cent goes to the unskilled and 51 per cent to the skilled labourers. However, the figures of approximate cost arrived at, are sufficiently accurate for the purpose.

I. Medium dressed stone-in-lime masonry with cement pointing on the outside, or brick-in-lime masonry with cement plastering on outside in colourcrete; lime plastering on the inside; reinforced cement concrete (R. C. C.) posts, partitions, beams and flooring; Bharat or similar cement tiled, or polished Tandur, paving in the

drawing and dining rooms and Shahabad or similar slab paving on 3-inch lime concrete in other rooms; half-panelled and half-glazed doors, full-glazed windows; roofing of Mangalore or similar tiles on teak wood ceiling or R. C. C. flat terrace; height of floors 10 to 12 ft., that of plinth 3 ft.; all other work of first class material and quality.

.... **Rs. 4/8.**

II. Rough dressed stone-in-lime masonry with cement pointing on the outside or brick-in-lime masonry with plaster in colourcrete cement on the front, and in cement on other exposed sides; lime plaster on the inside; R. C. C. posts, partitions, beams and flooring; Shahabad or similar slab paving on 3-inch lime concrete in all rooms; Mangalore tiled roof on corrugated iron sheets or R. C. C. flat terrace; half-glazed and half-panelled doors in the drawing and dining rooms, plane-planked in the remaining; fully-glazed windows; height of floors 9 ft., that of plinth 2 ft. All other work, strong, durable and decent but second class in quality.

.... **Rs. 3/8.**

III. Framed structure of round teak or R. C. C. posts with stone or burnt brick in mud masonry for walling; cement pointing on the outside; mud plastering on the inside; Shahabad or similar slab paving in the important rooms only, *murum* or mud flooring in the remaining; roof of country round tiles, or Mangalore or Allahabad tiles, on battens, or flat mud terrace; doors and windows all plane-planked; height of floors 8 ft. and that of plinth 1½ to 2 ft.

.... **Rs. 2/12.**

The above constants are applicable to single storey structures only. For storeyed structures, four annas should be deducted from the above constants, e.g. suppose Rs. 10,000 are available for building purposes. One can build a house with a plinth area of 2,222 sq. ft. of Class I; 2,857 sq. ft. of Class II; and 3,636 sq. ft. of Class III.

Putting it the other way, suppose a building is to be constructed on a plinth area of 2,000 sq. ft.

(1) With ground floor only, it would cost:

(Class I) 2000 × Rs. 4/8 (constant) = Rs. 9,000.

(Class II) 2000 × Rs. 3/8 (constant) = Rs. 7,000.

(Class III) 2000 × Rs. 2/12 (constant) = Rs. 5,500.

(2) With two storeys (the ground and first floor):

(Class I) 1000 × 4/8 + 1000 × 4/4 = Rs. 8,750.

(Class II) 1000 × 3/8 + 1000 × 3/4 = Rs. 6,750.

(Class III) 1000 × 2/12 + 1000 × 2/8 = Rs. 5,250.

Sometimes the rough cost is determined on the cubic content of the building. For this purpose, verandahs are supposed to be like rooms and the solid content of the house is found by multiplying the plinth area by the vertical height of the building from the ground level to half-way up the roof.

This method of finding out the rough cost is more accurate than that based on a rate per square foot of plinth area, especially if the heights are measured from the bottom of the foundation, as it takes into account the depth of foundation, the height of plinth and floors, and the pitch of the roof. But it requires more time for making calculations.

In the case of terraced or flat-roofed houses, the height should be measured up to the top of the parapet walls.

The rates thus arrived at are:

	Rs. As. Ps.
Class I	0- 4-10
Class II	0- 4- 6
Class III	0- 4- 5

Note: It is worth noting that the bigger the size of the rooms of a house, the lower is the incidence of cost; and inversely, the smaller the rooms, the greater is the cost per sq. ft. For, if a house, say a *chawl* (apartment house) for instance, has small rooms, the number of walls is greater, and with it that of windows and doors is also more. The latter, in particular, go to increase the cost. Again, a reduction in area of certain rooms does not always mean a proportionate reduction in the cost, because the number of doors and windows is not reduced; it remains the same. Hence, to reduce the cost a whole room or rooms must be omitted.

2

ECONOMY

WHETHER rich or poor, a man always likes to economize on his house. In fact, it is the social duty incumbent on everyone who wants to build a house, to practise economy wherever it is possible to do so. On the contrary, it is economically criminal not to do so. However, it should never be carried to excess so as to weaken the structure. A strong and solidly-built structure proves to be cheaper in the long run. Only the rich can afford to pay the heavy maintenance charges of cheap and jerry-built structures, which is not possible for ordinary people. Economy must really begin even with very trifling things. A trifle saved on a hundred items goes to make up a big amount. Below are given a few hints on how to practise economy:

(1) The first and foremost suggestion for economy is to get an estimate of the house framed by an expert, in which the thickness and the size of materials to be used is specified. It is a penny-wise-and-pound-foolish policy to grudge paying him his dues, which form a trifling percentage of the total cost. In its absence, if undersized material is used, the owner has sooner or later to pay heavily for it; if however, oversized material is used, it is not detected but is a national waste. By specifying the correct size, the architect would show avenues of saving Rs. 500 or even more, and further, make you care-free.

(2) The more the dimensions of length and breadth of a house approach each other, the less is its cost. In other words, an approximately square building is cheaper than an oblong one. To illustrate this, take the simple case of two houses, one measuring 80 ft. × 20 ft. and the other 40 ft. × 40 ft. Supposing the walls of both are of the same thickness (say 18 inches) as also the height of both is the same, viz. 20 ft., and taking only the outer walls, to simplify matters, the masonry of the first house is roughly:

$$\begin{array}{ll} \text{Long walls } 2 \times 80 \times 1.5 \times 20 = & 4{,}800 \\ \text{Short walls } 2 \times 80 \times 1.5 \times 20 = & 1{,}200 \\ \hline & 6{,}000 \text{ c.ft.} \end{array}$$

and that of the second,

$$4 \times 40 \times 1.5 \times 20 = 4{,}800 \text{ c.ft.}$$

Thus, the masonry of outer walls only of the first house is 25 per cent more than that of the second.

Moreover, there are certain special advantages in a square house over an oblong one, e.g. a square house is cooler in summer and warmer in winter than an oblong one, because the latter exposes a greater surface to the elements. The roof of the square house looks better and is simple and less costly to construct. Thirdly, a square house, being more compact, the space occupied by corridors, which are necessary for the preservation of the privacy of each room, is much less in a square house than in an oblong one, and so on. All this is true up to a certain limit, beyond which, however, either open central *chowks* (yards) or small verandahs have to be provided for lighting the inner rooms, in which considerable space is lost. Again, beyond a certain limit, the height of the roof of a square house near the centre, and also the length of the hip rafters—and in consequence their section—increase the cost.

From the point of view of the comfort of the inmates of a square house, unless it be a small and compact one, it is not recommended in tropical countries. It may be suitable for hill stations, especially in the winter.

(3) A storeyed building, having half the number of rooms on the ground and half on the first floor, is much cheaper than a bungalow or only a ground-floor structure, because the expense on account of foundations and roof for the storeyed building is nearly half of that for the ground-floor structure. Similarly, the expense for both on account of drainage channels on the ground and gutters below the eaves of the roof is also half. No doubt, the staircase requires some extra amount and scaffolding and hauling up materials for construction to an increased height is more expensive; but the saving caused in foundations and roof is much more than this extra expense.

Again, for a certain amount of accommodation, a ground-floor structure requires a larger plot of land than a storeyed building. Where the site is very costly, this consideration alone outweighs all others. Besides, it is no small gain, particularly in crowded localities, that the rooms on the upper floor get a freer and purer breeze, which is a blessing in summer in a hot country like India.

This principle, however, could be stretched up to a small attic-room, i.e. a low three-storeyed building, beyond which the cost again increases because the foundations and walls of a three or more storeyed building require to be of extra strength, and hence they are more costly.

(4) For the middle-class people, there is no better way of effecting a considerable economy than by restricting the height of floors. Ordinarily, 8 ft. or 8½ ft. height is sufficient. In some houses it is kept 12 or even 14 ft.

which is not only unnecessary but wasteful. It is likely to be argued that more height means more cubic content of air, which is no doubt true, but hygienically it is not the greater cubic content of a room but the means provided for renewing the air by providing *through* ventilation in it, which is of more importance; for this, cross ventilation, i.e. windows in one wall for admitting fresh air and similar ones in the opposite wall for driving out the vitiated air, is required.

Another argument likely to be advanced in favour of greater height of floors is that the building looks bold and prominent, but it should be remembered at the same time that the higher a building, the greater is the weight which its foundations have to bear and the more have its walls to resist the thrust of high winds. It is wrong to suppose that the artistic beauty of a building depends upon its height. It depends on the treatment of the proportions of its exterior parts towards each other, and the grace of its outline.

By reducing the height of floor from 10 ft. to 8 ft., the saving effected in masonry is 25 per cent; there is also a saving in the cost of a shorter staircase and a saving in the effort of climbing it. The latter point is of great importance from the point of view of the aged, infirm, or ailing member in the house.

It is not, however, advisable to try to effect economy by curtailing the height of the plinth. A high plinth contributes to preserve sanitation and health of the family and, hence, as far as possible, it should not be reduced to less than 2 ft. However, 4 or 5 ft. height of plinth, which is oftentimes kept (unless it be in a damp locality or for accommodating a cellar) is a waste, which the middle or lower class people cannot afford.

(5) Another means of reducing the cost of a building is to build the outer walls thick enough to protect the house from the heat of the sun and raids of thieves and to build all the inner ones of half or one brick thickness (4½ inches or 9 inches) with intermediate posts of wood, steel, or R. C. C. to support the weight of the upper floor or floors and roof. It has now been possible to build R. C. C. partitions of any thickness up to a minimum of 1½ inches. It is observed in a good many houses that 15-inch brick walls or many times 18-inch stone walls are built, where half or one brick partition walls could very well have answered the purpose. The main object of a partition wall is to afford privacy; any extra thickness beyond that required for that purpose is, therefore, a waste.*

(6) Local usage should be adopted as far as possible. Maximum advantage should be taken of the material and labour locally available, e. g. if

*For making the partitions sound-proof, please refer to the author's *Sulabha Vastu Shastra* or *Build Your Own Home*.

stone walls are insisted upon where stone is scarce and hence bricks are locally used, or if Moulmein teak is insisted upon where good country timber is plentiful and cheap, the work is bound to be costly.

(7) Division of labour and specialization are great points in saving money, particularly when the work is being done departmentally. Masons who are used to dressing, should be employed on dressing only, and those to setting, on setting only. An artisan of high wages should not be required to do the work of an unskilled coolie. This is a very important point which is generally overlooked, e. g. if a mason getting Rs. 2 a day is employed on the work of pointing masonry joints, perhaps, he may do even less work than young boys who usually do that work on a daily wage of annas 8 or 10, and who have specialized in it. Another point to be borne in mind is never to allow a highly paid artisan to be handicapped for want of adequate assistance, e. g. for want of an additional woman-coolie getting 4 to 5 annas per day, if a mason employed on Rs. 2 per day is required to do her work partly, such as mixing mortar, carrying bricks, stones, etc., two rupees are sacrificed to save five annas. Similarly, a bullock-cart is often engaged on Rs. 2 per day for carrying certain material over a short distance; the cart-man has to load and unload it single-handed. During the interval he is doing it, the high-waged cart has to stand still, and it is no wonder if the output is far less in comparison to the amount spent.

(8) A good deal depends upon the season in which the building work is commenced. In winter, the days are short and it is not possible to start the work earlier than 8 A. M. Besides, the progress of the work in the first hour or so is not satisfactory on account of cold. Again, the work has to be closed by 5 P.M. as the labourers have perhaps to wend their long way home before dark; thus with a respite of two hours in the noon, the actual working period amounts to seven hours, whereas if the building work is commenced by about the close of winter, the working period from 7 A. M. to 7 P. M. with the same meal-time respite, is 10 hours. Thus a saving of 28 per cent in the cost of labour or nearly more than 9 per cent of the whole work is effected.

(9) If work is done expeditiously (of course, without undue haste), it is done at a much less cost than if it is allowed to linger on. The overhead charges of establishment are less and the interest on the capital outlay during construction is less. Anticipate all likely difficulties and try to solve them early in good time. For this, it is desirable to chalk out a programme not only for the whole season, but also a detailed one for every 2 or 3 days in advance, and then try to stick to it.

(10) If doors and windows are kept of one uniform width, the joiners who have to work on uniform sizes find it much easier and finish it more speedily. Again, fewer centerings are required for supporting lintels or arches over them. In other words, standardization of sizes and materials is very helpful in reducing costs.

(11) It is usual to rake out joints of masonry and fill them again with lime or cement. By so doing, not only is there a waste caused of materials and labour, but the structure is weakened because it is not possible to make a good joint of fresh cement or lime with the mortar which has already set; again, the joints filled afterwards are likely to be neglected in respect of watering. The proper method is to rake out the joints when just fresh and fill them up with lime or cement; in this arrangement the mortar raked out is not wasted and the joints automatically get the water which is sprinkled on the masonry. A still better and the most economical way is not to rake out the joints at all, but to finish them neatly in the first instance and rub them hard with a mason's trowel the next day, saving double labour and material thereby.

This suggestion is applicable to plastering even with a greater force. Instead of wasting time in finishing the joints and again raking them out after some days prior to plastering, it is economical to leave them rough or rake them while making in the first instance.

(12) Settle, once for all, the plan of the building, stick to it and never make any changes or alterations except under the advice of experts who will consider the effects of such alterations on the work already done, the extra cost involved, etc., and guide you accordingly.

(13) Plain and simple architecture not only looks well but is also very economical. Bay windows, ingle-nooks, too many corners in the walls, and too many breaks in the roof are bound to increase the cost.

(14) If it is intended to add another floor in course of time, it is advisable in the interest of economy to construct in the first instance a flat or terraced roof at an additional cost of about 10 per cent of expenditure on the item of roofing. In that event the top of the terrace would ultimately form the floor of the upper storey, and the parapets when raised would become walls. Nothing would thus be wasted, whereas, if a tiled roof is required to be dismantled for the same purpose, not even 40 per cent of the material is found to be serviceable, all labour being wasted, besides.

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(15) If the sinks, bath-rooms and w. c.'s are so placed that all the sanitary fittings come near each other, a considerable amount is saved.

(16) A considerable saving may be made by buying materials at the proper time and in the best market and by maintaining a continuous supply of them at the job.

(17) On small jobs, in particular, work could be done more cheaply by using what are called "stock sizes." For instance, up to a span of 11 ft. or at the most 12 ft., steel joists of 4¾″ × 1¾″—6.5 lbs. per foot run, are very cheap. If the span is increased even by 6 inches the next suitable size of joists is 6″ × 3″—12 lbs. per foot run, which costs considerably more, even though its spacing may be increased.

3

SELECTION OF SITE

Two different viewpoints, which are in principle antagonistic to each other, govern the consideration of this very important matter. The one is of a class of builders who may rightly be called speculating builders. They do not want to build for their own use but for that of others, and therefore, do not so much care for the internal arrangements and conveniences of houses as for the immediate maximum return on the capital outlay. Their tendency is to select a locality, which, though unimportant and not much in demand at present, is likely to rise soon into importance. The sites at such places are very cheap in the beginning but when they develop they fetch amounts several times their purchase value.

For the benefit of these people it may be suggested here that such localities may take years to develop, or, in some cases, may not develop at all. It all depends upon several factors not controlled or controllable by any one man or sometimes a group of men. It requires an uncommon shrewdness and keen foresight, which very few people possess, to judge those factors correctly. It is, therefore, advisable, as it involves no risk from the investment point of view to choose a street which has already developed. There we know the situation in its reality. The class and sort of people inhabiting that part, the rental value of buildings obtaining at the place, whether the latter is increasing or decreasing, and so on. Thus, though the return may not be so great, it is a sure source of income. Again, from the point of view of investment, if the building is not required for one's own residence, it is prudent not to build on a commodious scale. If instead of building one spacious house suitable for one rich family, several small independent flats or cottages suitable for middle or poor class families are built, there are very few chances of losses resulting from empties.

The other viewpoint of looking for selection of a site is whether it is for one's own residence or for that for a collective one—either industrial or co-operative housing. The considerations for the latter are slightly different. Those which are common to both are given here. They are in respect of (1) physical features (2) soil conditions (3) sanitary requirements and (4) practical conveniences.

(1) The site should be on elevated ground which is advantageous in two ways: (a) the out-look is wider and brighter and (b) it affords facility of drainage. Particularly, rain-water flows away from the building as soon as it falls on the ground and the immediate surrounding area is left dry. A low-lying site, on the other hand, is likely to be damp and unhealthy, especially in the rainy reason.

H. F.—2

Rocky surface affords good foundations and also does not absorb any water, but it gets hot by day and does not readily cool down by night, especially in summer. Again, if any excavation or levelling of site is necessary, it presents difficulties. Laying of drains or excavation of gutters cannot be done satisfactorily except at prohibitive expense. Besides, it is not suitable for a garden or for growing trees.

Soft *murum* at surface with hard *murum* or rock within 3 or 4 ft. is the best soil; next best are gravel and sand. They easily drain off rain-water. But the possible rise of sub-soil water level in them is an undesirable feature, unless the site is lying high. Besides, there is a danger of their absorbing impurities from defective drains, cess-pools, etc., contaminating underground supply of water. Moreover, sandy and gravelly soils tend to make the house hot. In this latter respect, clay is better, and if firm, gives a good foundation; but if it is black cotton soil, it is the worst in this respect, requiring special expensive treatment of foundations and sub-soil drainage.

Trees grown in the neighbourhood, if thick, tend to keep the temperature equable and lend a charm to the landscape.

In the neighbourhood of the sea, the difference in the extremes of temperature is very small and there is a pleasant breeze blowing towards the land by day, and away from it by night, as the land gets hotter by day and cools sooner by night. The sea breeze is very exhilarating as it contains ozone. But the air near the sea is always humid which induces perspiration causing discomfort, languidness and enervation as it is often very sultry and oppressive. There is another disadvantage of sites in the neighbourhood of the sea, viz. the breeze, which carries with it a very thin spray of salty water, acts upon iron and causes it to rust. Trees and gardens also do not flourish in the neighbourhood of the sea for the same reason.

From the sanitary point of view, there should be no *nallas*, stagnant pools of water, old quarries, or tanks and wells in a dilapidated condition in the neighbourhood of sites. If the wells are in good condition with a copious supply of pure water, their existence adds to the value of the site.

The site should not be on reclaimed ground, i.e. ground which was once a depression and filled up afterwards with some animal and vegetable refuse. In the first place, such ground absorbs water, becomes waterlogged, and very often the stuff putrefies giving out foul gases, most detrimental to human health. Secondly, there is a likelihood of the nuisance of flies breeding in the refuse in the ground. Thirdly, there is always a risk of an uneven settlement of the foundation and all the dangers to the building consequent upon it —a state which can be remedied only at a prohibitive cost.

A busy street, though desirable from a business point of view, is quite unsuitable for residential purposes, since the nuisance of dust caused by heavy vehicular traffic is positively harmful, and the constant noise created thereby deprives one of rest, especially during sickness.

Pens of cattle, cesspits, lime or charcoal kilns, tanneries, ginning factories, etc., giving out smoke, foul odours and objectionable noises, should be avoided even in a distant neighbourhood. Lofty buildings and tall trees obstruct the breeze. The latter should be under one's control so that they could be pruned or lopped off at any moment without trespassing on the rights of anybody else.

A good and sufficient supply of drinking-water should be close at hand. In rural districts, it is an ideal condition to have one's own well. If it be a public one, its water must be beyond any chance of being polluted even at any future date.

From a practical point of view, the proximity of a railway station is obviously beneficial (not very close as otherwise sleep is disturbed—a very important point in sickness), a public but not a very busy street, a post office, a hospital, a bank, a school, and the market. Of these, it is absolutely necessary for the middle and lower classes to have the school not very far off.

It is necessary in the interest of the permanent happiness of the family to have a good neighbourhood.

A free-hold site is infinitely superior to a lease-hold one. Before finally settling the bargain, the legal aspect of the question should be scrutinised with the help of a lawyer.

It is advisable to make provision for an additional space of land so that it would be easy to add a wing afterwards to prevent congestion.

4

ORIENTATION

PROPER orientation means that setting, or facing, of the plan of a building which allows the inmates of the house to enjoy to the utmost whatever is good, and to avoid whatever is bad in respect of comfort in the elements of nature, such as the sun, wind, and rain. Attention to this important factor, particularly in the tropical countries, is of great moment. The word "orientation" has been used here in a broad sense. It implies not only the direction of the main front of the house, but also the back and two side facings.

Good orientation means proper placement of rooms in relation to the sun, wind, rain, topography and outlook, and at the same time providing a convenient access both to the street and backyard.

According to the Hindu orthodox principles, a building should not, as a rule, face the south. But the wise men of old have provided an exception to this rule, viz. that there is no objection to this, provided there is a house or row of houses on the opposite side facing the north. In most of the western countries of Europe, an aspect which gives the maximum sunshine, is preferred. In those latitudes, the sun never goes overhead, i.e. it is always to the south of the zenith. Besides, the climate of those places being very cold, the warmth of the sun is most enjoyable. Hence they provide for a southern aspect which gives them the maximum sunshine throughout the year. Here in India and in other tropical countries, what is sought for is just the opposite. We want to devise means to reduce the sun's heat to a minimum, especially in summer, when its rays strike us vertically, or nearly so.

The sun's action in causing heat is mostly direct by day, but by night it is entirely indirect. Stones, bricks and tiles, etc., of which the walls and roof of a house are composed, absorb sun's heat by day which they slowly radiate by night. While doing so, the air in contact with them is heated, which is the real cause of discomfort by night. Hence, proper orientation must protect the house from both, i.e. sun's direct heat by day and the indirect one by night.

Let us first consider the direct heat by day. The temperature of a place, though, no doubt, modified by several local influences such as proximity of a sea-coast, hills, valleys and sandy deserts, etc., or also by the elevation above sea-level, soil, vegetation and woods, etc., is mainly governed by the latitude of the place, or, which amounts to the same thing, the altitude of the sun above

the horizon of the place. The mean daily altitude of the sun is highest in tropics or the torrid zone, and decreases as one goes either northward or southward towards the arctic or the antarctic zone. The total heat absorbed depends, again, on two factors, (1) the intensity and (2) the duration. The aim of proper orientation must be to admit the required amount of sunshine into the house in the morning when it is very pleasant and the intensity of its heat is less, and to minimise its duration in the afternoon and evening when its rays are again likely to enter the house. In the noon-time the sun is generally overhead in the tropics and, therefore, its rays are not likely to enter the house.

The sun's rays are potent to kill disease germs, but for that purpose severe heat is not necessarily required. The morning sun not only does it satisfactorily, but lends cheerfulness in addition, coming as it does after the chill and darkness of the night. The reason for this is that there is full light but very little heat in the morning sunshine. The cause of the less heat is threefold: (1) The morning sun is inclined at a low angle with the horizon; its slanting rays being spread over a larger area, bring to each square unit of surface less heat and thus diminish its effect. (2) The oblique rays have to pass through a greater thickness of atmosphere which has already cooled down by the night, and again, (3) The air in the morning is charged with water vapour which allows the light rays to pass freely but absorbs the heat rays in their passage. As the sun rises, its rays fall more and more vertically, and heat becomes more and more concentrated. The moisture in the air also slowly disappears and the heat rays are less and less absorbed. In the afternoon and evening, even though the rays are again slanting, the air being dry, heat rays which are no longer absorbed are intensely felt. That is why the evening sun is not so pleasant and charming as it is in the morning, and therefore is abhorred to a certain extent.

Thus we see that a certain amount of sunshine inside the house is not only desirable but welcome. However, when we have had enough of sunshine, and it becomes warmer, it should be shut off. Mere closing down of windows for this purpose is not sufficient, because in that case it will still heat the walls, and their radiation will make the rooms on that side quite uncomfortable. Hence we must so set or face the building that the sun's rays will be effectually excluded without closing windows in the late hours of the morning, especially in summer.

By the facing of the building is meant the placing of such rooms which are mostly occupied during the day-time, on that side, and providing large windows in the walls on that side with projecting *chhajjahs*, or sunshades, at their crest in order to regulate the inflow of sunshine. These should be located at such a height and should project so much beyond the wall that as

soon as the morning sun rises above a certain height and the air becomes warm, its rays should be automatically cut off by the projection. However, the sun is welcome and enjoyed much longer in winter than in summer. The ideal would, therefore, be accomplished if the sunshades are so designed that they are capable of being raised or lowered, and also rotated about a horizontal axis at varying angles so as to keep them in any desired position and at any desired inclination according to the season.

If a certain amount of sunshine is allowed to penetrate into the house during early morning hours, it is bound to do so also a few hours in the late evening; to effectually exclude this and render it harmless, deep verandahs on the south and west side have to be provided.

We have discussed above how it is possible to regulate the sunshine, but it is not the only factor contributing towards comfort. Air in motion, or what is called breeze, and aqueous vapour or the relative humidity in the air are equally or perhaps more important than heat. It is the general experience that in spite of a low and equable temperature of sea-coast places, a still atmosphere which does not materially help evaporation, causes greater discomfort at those places than a comparatively high temperature in dry, arid plains, accompanied by a breeze. A high humidity causes perspiration, and if the atmosphere be calm and still, which does not cause evaporation from the surface of the human body, what is called "sultriness" is the result.

The direction of the prevailing wind, especially in summer, when it is most needed, is between the West and South. The exact angle depends upon a number of local influences which need not be discussed here; to derive the maximum comfort from the breeze, the bed-rooms which are occupied by night must be located in its direction, but if they are directly exposed to the afternoon sun, they are heated and the radiation of their heat by night, as we have seen above, will warm the breeze and make the rooms hot and uncomfortable. Hence, deep open verandahs both on the South and West are necessary.

To recapitulate, for proper orientation, (a) place all the rooms which are usually occupied by day on the North and East and (b) place the bed-rooms in the direction of the prevailing wind and provide deep open verandahs to protect them from the heat of the afternoon sun.

5

THE PLAN

As a general rule, the shape of a plan is governed by the configuration of the building plot, and its nature—whether compact and closed or extended and open—is influenced by the climatic conditions of the place.

Thus at places where the climate, either very cold or very hot, is the deciding factor, the plan needs to be compact and closed. For example, on a hill-station like Simla, on account of the extreme cold obtaining there, a closed, compact plan—a square or a rectangle approaching a square in shape, with an inner central passage to serve the rooms instead of outside verandahs—is a very convenient one. Similarly in the plains, at Allahabad for example, the extreme heat in the summer is the governing factor, and it makes obligatory to design a house with one or two central lofty apartments, ventilated and lighted by means of clerestory windows below the ceiling. Round these apartments are grouped other rooms, and beyond these rooms are built verandahs on the West and South, to shelter the walls of these rooms from the direct rays of the afternoon sun. During the hot days, the outside hot air is excluded by closing the apertures so that the inner rooms, particularly the central apartments, remain cool.

In places on the sea-coast, at Bombay and Madras for example, on the other hand, it is the moisture and not the heat which mainly affects comfort. The object here is to expose as much area of the house to the outside air, and admit as much breeze into the rooms as possible. Hence, an open, extended plan resembling the letters L, E, U or H, with large windows in outside walls is very suitable. Further, there should be as much open space in front and around buildings as possible. Areas of rooms should also be larger, it does not matter if the height is curtailed.

At places other than these, i.e. the places which are situated neither on hills nor on the sea-coast, and which do not have the climatic conditions similar to those on the plains, there is neither extreme cold in winter nor extreme heat in summer, and unless there is a large surface of water like that of a lake or a river in close proximity, the weather is comparatively dry. At these places, the extended plan not only makes for comfort but also for the preservation of health.

A number of varying factors affect the consideration of planning a domestic building. Hence, no very hard and fast rules can be laid down for general application. No two sites could possibly have identical conditions.

Individual requirements and idiosyncrasies, which could never be alike, lead to a number of varieties in it. The situation of the site, whether in town, suburb or in the country, plays an important part in the determination of the plan. That, again, differs according to the amount of accommodation required, by reason, too, of its alternative treatment, whether a "detached," "semi-detached," "flat," *chawl,* a cottage or a bungalow, and so on. Even in a town it may differ according to the street, neighbourhood, aspect, surroundings, also rental value and restricting bye-laws of the local authority.

In spite of this variety, certain features which govern the theory of planning are common to buildings of all classes intended to be used for residential purposes. They are enunciated below:

(1) Aspect
(2) Privacy
(3) Prospect
(4) Grouping
(5) Roominess
(6) Furniture Requirements
(7) Sanitation
(8) Flexibility
(9) Circulation
(10) Practical Considerations

(1) ASPECT.—By aspect I mean the peculiarity of the arrangement of the doors and windows in the outside walls of a dwelling, which allows it to enjoy to the utmost the gifts of nature such as sunshine, breeze, view of the landscape, etc. This is a very important consideration in planning. It is a truth universally admitted that one's thoughts are moulded by one's surroundings; that outside influences play an important role in the development of the human mind. If they are pleasant and cheerful, people living in their midst are contented and happy; if, on the other hand, they are dull and dismal, they cast a gloomy shadow on their minds. It is for this reason that people of humble means living in small cottages stand most in need of the two factors, viz. Aspect and Prospect.

A building must be designed to suit the site with all its varying aspects. Aspect not only provides comfort but is requisite from the hygienic point of view as well. The value of the sun's rays cannot be over-estimated. They are potent destroyers of organic poison spreading diseases, and lend a cheerful and genial air to the rooms. With a careful disposition of windows, it is possible to admit sun's rays into any desired room. A kitchen should have an Eastern aspect so that the morning sun would purify the air in it, and it would remain cool in the latter half of the day; the bed-rooms should have a S.-E. or S.-W. aspect; the drawing-room, N.-E. or S.-E., and so on.

(2) PRIVACY.—This is next in importance in the design of domestic dwellings. If they lack in the respect of privacy, it is a deplorable fault which cannot be compensated for by a host of other merits. Privacy is of two kinds: (a) The one is in respect of screening the interior of any one room from the

other rooms of the house and also from the main entrance, while, (b) the other is the privacy of the whole house from the high-ways and by-ways. The latter is, comparatively speaking, easily secured by carefully planning the entrance and screening it with trees or creepers trained on a trellis. But the former requires a carefully thought-out plan. The internal privacy of a domestic house could be maintained in the following way:

(A) Proper grouping, i.e. disposition of various departments and parts of the building in their relation towards each other, which, particularly in economic and compact planning, requires great skill on the part of the architect.

(B) Proper disposition of doors. For instance, if a door is fixed in the centre of the shorter wall of a room, the interior of the whole room is exposed to view, whereas if it is fixed in a corner of the larger wall, the larger part of the room is screened.

(C) The mode of hanging doors.

(D) Provision of a small corridor or lobby.

All the above methods have been illustrated further on in this volume with concrete examples in the notes describing various designs.

Privacy is of supreme importance in the following rooms in particular: bed-rooms, and all rooms in which sanitary arrangements are usually made, such as toilet-rooms, water-closets and earth-closets, urinals, bath-rooms, etc. The kitchen department also should be kept out of the view of the passers-by. As far as possible, every room—except perhaps the drawing-room—should have an independent access to it. Again, services such as bath-room, toilet and w. c., should have an independent passage to them from every room, and the real skill of the architect lies in so disposing of the rooms with respect to the position of the services that a minimum space is occupied in these passages. This is called compact planning which is the very essence of economical designing.

"Privacy" is not the same as "seclusion." The latter is sought to be secured in a room for worship, in a study, or in a library. A business man's or a manager's office is strictly private, though in the interest of business it cannot be located in a secluded corner; on the contrary it must be situated in a prominent place easily accessible to the public and situated in the centre of the various departments.

(3) PROSPECT.—In its proper sense, "prospect" has reference to the impression that the house is likely to make on a person viewing it from the outside. It includes taking full advantage of the beauties of nature in the landscape by revealing to a stranger certain pleasant features, and also by concealing from his eye some undesirable ones in the general appearance of

the house. It must not only be attractive in external appearance but must also possess such qualities as comfort, cheerfulness, security, labour-saving and up-to-dateness. It must also prove a good investment. The sense of pride that one's own house has not only a smart, pleasing appearance but a certain individuality which differentiates it from the houses of others and the effort to maintain that individuality which occupies part of one's time, are potent factors in the amelioration of life of the poor who have otherwise continually to struggle against odds in life. Undue prominence, however, should not be given to this feature, and it should not be the only or even the principal desideratum in designing the elevation of domestic dwellings, particularly for housing the middle or poorer classes. Just a small projection here, a bay window there, casually provided to break the dull monotony at a small extra cost, which, considering the benefits it gives, is not only justifiable but necessary. This should not, however, be treated as an extra item in the estimate and considerable money spent over it. Bay windows not only fulfil this requirement, but in addition help in giving breeze, light and sunny aspect all the year round. Some of the forms of bay windows are shown below:

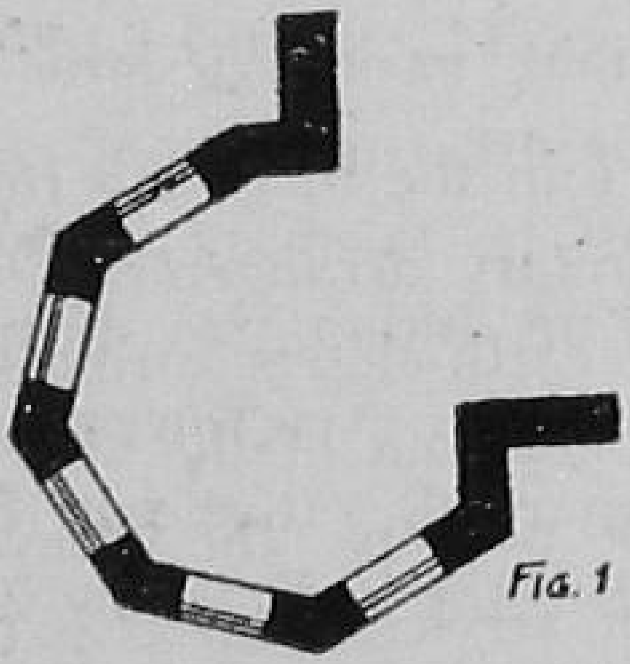
Fig. 1

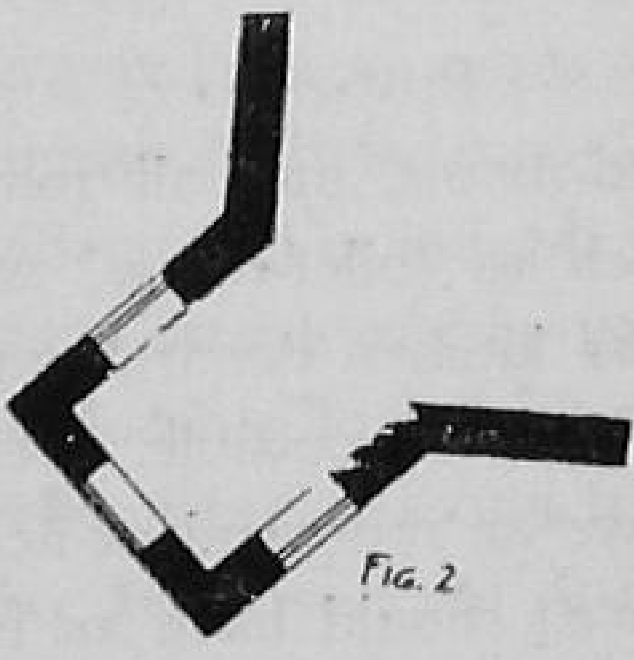
Fig. 2

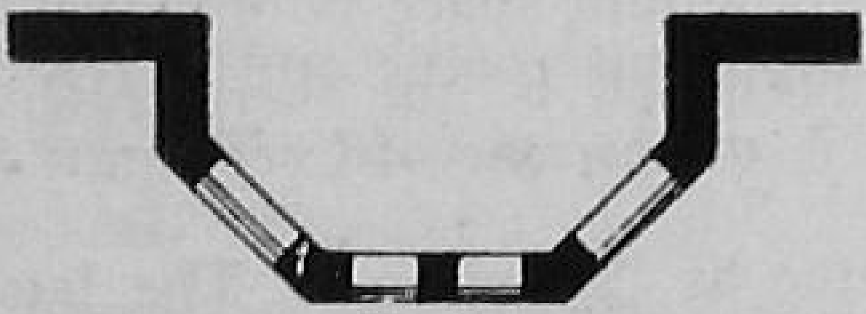
Fig. 3

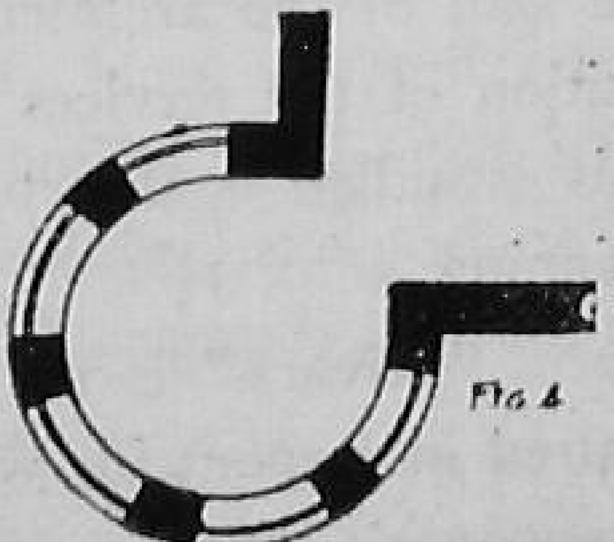
Fig. 4

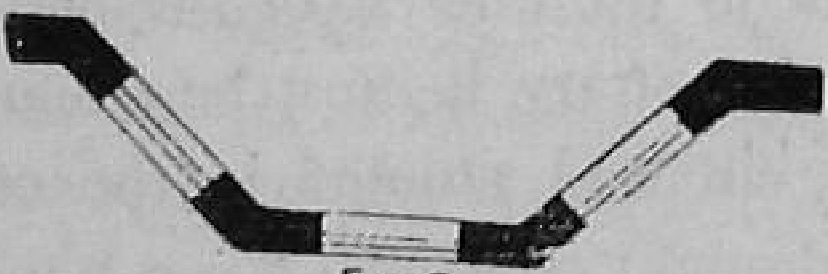
Fig 5

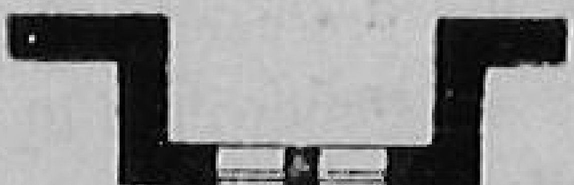
Fig 6

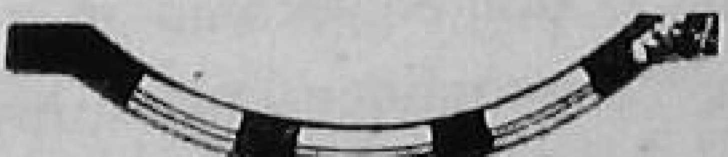
Fig. 7.

(4) GROUPING.—Grouping means the disposition of rooms in respect of their relative positions towards each other. If a building fails in this respect, no amount of care taken in all others is of any avail. The dining-room must be close to the kitchen; the latter, again, must be away from the drawing- or

the main living-room, otherwise kitchen smells and smoke would detract from their usefulness. Services must be nearer to, and independently accessible from, every bed-room. The w. c.'s, etc. must be far removed from the kitchen and dining-room, and so on. This subject has been treated in detail later on in a special section under "Grouping."

(5) ROOMINESS.—Roominess is the opposite of crampedness. It has a reference to the effect produced by making the best of small proportions of rooms, by deriving the maximum benefit from the minimum dimensions of a room; or to accomplish economy of space, at the same time avoiding cramping of the plan. It looks so simple a task at first sight, but is really so difficult an art that it often taxes the brains of the architect. A room whose walls are disproportionately high looks much smaller than it actually is. Similarly, if the length of a room exceeds 1½ times its width, it produces a cramped effect. A square room looks smaller and in respect of utility it is really so as compared with an oblong one of the same superficial floor area. For example, if a small table is placed in the centre of a room 10′ × 10′, the small space equally divided on all its four sides is much less useful than the extra space left on two sides of it in a room measuring 12′ × 8½′ which has practically the same area. Every square foot of the area under roof costs 8 to 12 rupees. Hence, the maximum advantage must be taken of every nook and corner of the house before thinking of making an addition to the plinth area. Plentiful provision of wall cupboards should be made; even the narrowest space under the flights of stairs should not be disregarded. It should be enclosed and turned into a useful store-room. The space in the walls below the window-sills down to the floor level, could be used by way of a cupboard. This latter arrangement provides a cupboard at a very cheap rate, because it dispenses with an extra lintel or arch. Provision of such conveniences together with one or two lofts below the ceiling in unimportant rooms and a few wall-shelves supported on brackets, would render it unnecessary to set apart a separate store-room in small cottages.

(6) FURNITURE REQUIREMENTS.—This matter, though of considerable importance, is often most neglected. Bed-rooms must be designed with due thought and attention to the prospective position of the beds. Otherwise the latter have to be cramped up somewhere in it, either in a position exposed to view, or opposite to a window facing a strong draught of wind. Even now I can vividly picture before my mind the house of a friend, visited some time ago. It was elaborately treated in respect of rich external decorations, but the sitting-room was too small to accommodate a table in the centre consistent with sufficient elbow room. Another room could not accommodate a bed in any position without coming in the way of either a wardrobe, or a door, or a

window. It is best, therefore, to show in the plan the positions not only of beds but also of heavy pieces of furniture such as sofas, almyrrahs and Chesterfield suites, and even of pegs. It is necessary to exercise forethought and imagination in this respect.

(7) SANITATION.—Sanitation is of very great importance for a dwelling, because on it depend the health and the happiness of the inmates. Sanitation embodies provision for ample light and ventilation and due attention to general cleanliness and sanitary conveniences.

Light.—Absence of light has a deleterious effect even on plants, which, if placed in a dark room, soon lose their lustre, and oftentimes droop and die. People who have to work in mines, cellars and other dark places look pale and anæmic. This is due to the fact that sunlight, direct or diffused, acts directly upon the corpuscles of the blood and makes the blood flow vigorously with its natural bright red hue. Sun's light, not even direct but diffused, is found to be potent to destroy germs of tuberculosis. Hence, too much stress cannot be laid on getting light into the house as profusely as possible. There should not be a single corner in the whole house which is not sufficiently lighted. Particular care must be taken to light passages and staircases—the places where there are chances of collision and accident taking place. As far as possible long and narrow passages which are difficult to be sufficiently lighted should be avoided. If they are at all unavoidable, sky-lights should be provided in addition.

Cleanliness.—This includes, also, the means provided for cleansing. In India water carriage and sewerage systems have developed only in a few large cities. There it is comparatively easy to keep the premises clean, but in other cities and towns and in all rural districts this matter is very much neglected. In this connection, the following extract taken from Dr. Poore's *Rural Hygiene* will be found to be very useful. In country districts, every cottage ought to have a bit of garden—about one-half of an acre or more, and adopt the following system of sanitation:

(1) "All excrement should be kept out of the drains; for by doing this the putrefaction of the solid is prevented and the purification of the liquid by filtration through the earth is effected with ease which is proportionate to the thinness of the fluid.

(2) "All solid matter should be removed every day from the immediate neighbourhood of the house and buried in the top layer of cultivated ground. This surface layer is full of living organisms which rapidly disintegrate and oxidise any substance deposited in it, until in a very short time—in summer, within less than a week in tropical countries like India—the filth becomes

fertile "humus" or mould. Household slops should be poured on to the surface of the garden and the mistake of attempting what is called sub-soil irrigation must not be made.

(3) "Earth closets with movable pails should be outside the dwelling house, approached by a covered passage, with a cross-ventilation. Sifted garden mould, taken from the top layer and dried in a shed—not by a stove—is most suitable for use. If specially constructed, as in Denmark, Sweden and Norway, so as to separate liquid from solid deposits, and if kept from household slops and other liquids, earth closets are not only free from nuisance but will provide valuable manure.

(4) "With regard to other solid refuse, the rules must be—

(a) Whatever is capable of rotting must be put in a heap to humify.

(b) Whatever is not capable of rotting must be burnt.

(5) "As for domestic slop water, it must never be discharged from the house below the level of the ground. The coarser impurities must be strained out by passing it through a filter of gravel or cinders, and in its transit to the filter-bed it should be kept freely exposed to air in its entire course. If this is done, the exposure to air, sun, heat, cold, and drying winds, hold putrefaction in check, and render impossible the escape of foul gases into the house. The key to success is the separation, in every possible way, of solids from liquids."

Dust is a great enemy of health and its proper significance is not adequately understood in India. Most of the diseases are spread by it; hence one should strive to minimise the chances of accumulation of dust and other decaying matter. This could be done in the following ways:

(1) No mouldings, not even skirtings and cornices, should be allowed, particularly on the inner surface of walls.

(2) Ledges, nooks, crevices and all unseen spaces which could possibly give dust a lodgement, should be avoided.

(3) All edges and corners should be rounded.

(4) Angles made by junctions of walls with floors and ceilings should be rounded.

(5) Non-absorbent materials like glazed tiles should be provided in the w. c.s and kitchens for flooring and skirting all round the walls.

(6) Trellis work in verandahs should have large apertures to facilitate cleaning, and railing of galleries and balconies should be of a plain and simple design for being easily cleaned.

Ventilation.—In providing windows for ventilation, particularly in *chawls* and flats, the habits of the people likely to live in them should be taken

into account. Over-ventilation is harmless while under-ventilation is positively harmful. Hence there should be a tendency to err on the safe side by providing more ventilation than is absolutely necessary. In designing *chawls* and flats, provision should be made for sufficient ventilation even though the windows may be closed for fear of draught as is the wont of the people occupying them. This could be done by providing floor ventilators in the walls facing an open space. They should be about 18 inches long and 5 inches high, closed by fixed venetians or "hit-and-miss" sliding shutters as shown in the sketch (see Figs. 8 & 9). Whenever there is a high wind which is likely to cause an

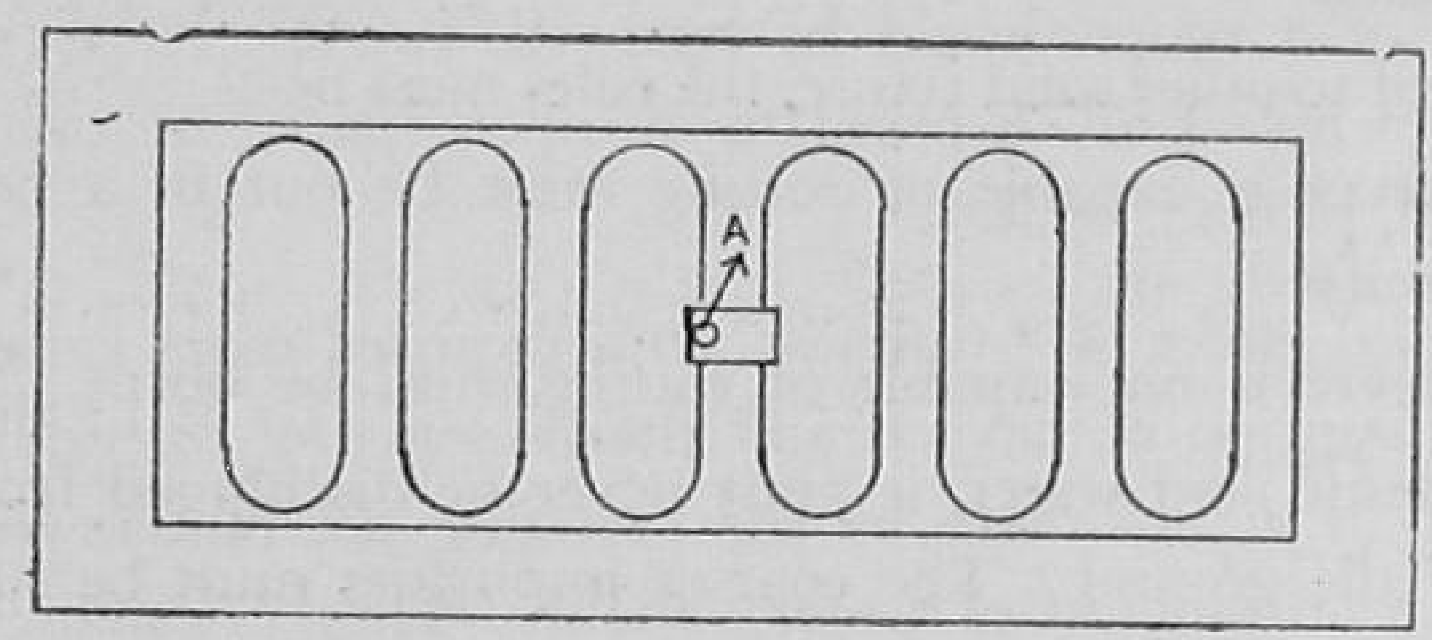

Fig. 8

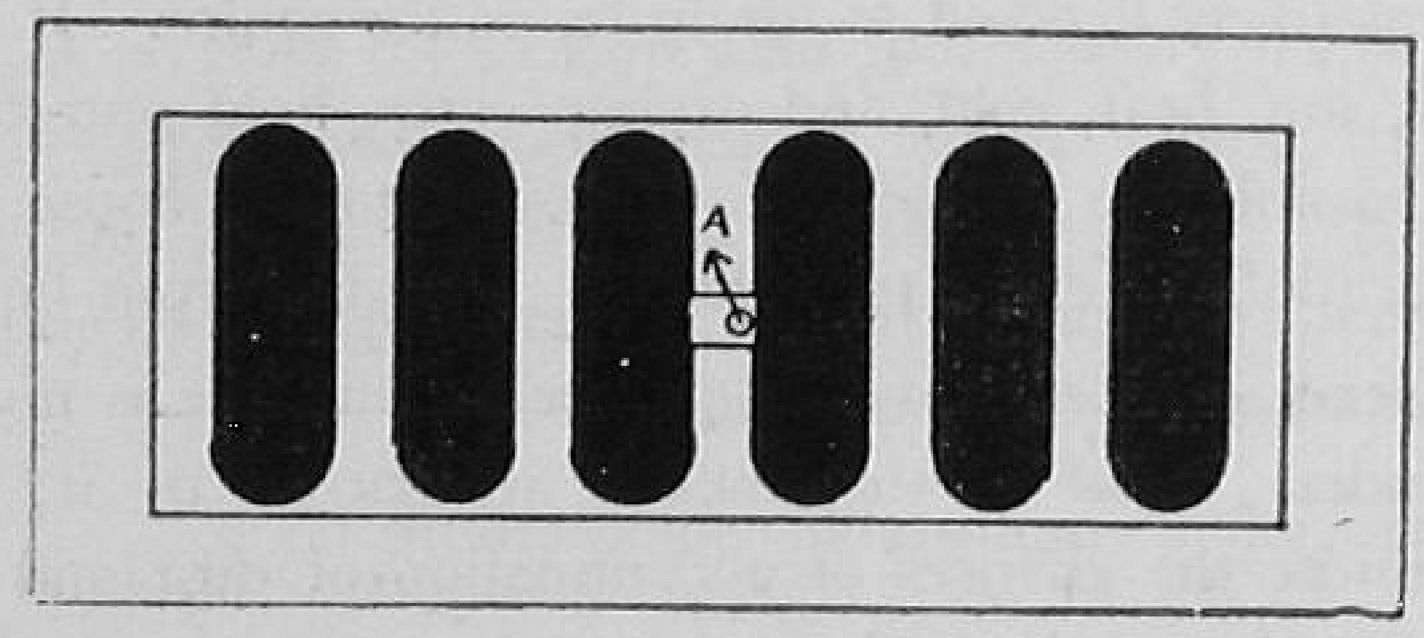

Fig. 9

exposure to a person sleeping on the floor (which is the practice in many parts of India) the movement of the button A, one inch either way, could partially or wholly close the apertures. In addition to these, ridge ventilators near the ceiling are required. For these, either bull's eyes or clerestory windows should be provided a little below the ceiling; or better still, the main windows should be carried to within 6 inches or a foot below the ceiling. The theory is that the lower layer of air in a room which is warmed by the human breath and to a certain extent by the radiation of heat from the human body, becoming lighter by the warmth, rises to the top. Unless efficient means like windows near the ceiling are provided for driving it out, it is likely to cool down, become heavy again, descend, and be necessarily inhaled. It is injurious to health because it is devoid of oxygen which has already been used up.

Ventilation means much more than simply supplying fresh air to a room. It also connotes the evacuation of the vitiated air and the maintenance of a movement of air in the house.

Movement or lack of movement of air is conducive to a feeling of well-being or discomfort, or leading, in the latter case, to serious results. Lack of movement of air leads to increase in temperature, increase in humidity, which leads to hindrance of evaporation from the body surface, heat accumulation, and finally heatstroke.

For a thorough ventilation, one large window situated in the centre of an outer wall is not sufficient, but there should be another window or windows in the opposite wall.

This is called "through ventilation." In order that the air in every nook and corner of a room should be renewed, two or three apertures distributed over the whole wall, exposed to an open space, are preferable to one large window fixed, instead, on it.

The so-called effect of "stuffiness" in a crowded room is caused not only by the partial exhaustion of oxygen and the presence of an undue amount of carbonic acid gas in it, but more by the fact that the human exhalations are warm and contain an amount of water vapour. They are, moreover, charged with microscopically small particles of organic matter (part of which also deposits on teeth) which gives a foul oral smell. In addition to this, the humidity and warmth caused by the breath induce perspiration on bodies of people occupying the room, which also adds to the smell, and all these contribute to cause that well-known feeling of "stuffiness." Hence the function of satisfactory ventilation must be four-fold, to create,

(1) A sensation of comfortable coolness to the body,

(2) Freedom from bad smell,

(3) Reduction in humidity,

(4) Proper supply of oxygen.

All this must be secured without producing a perceptible draught.

The relation of window area to that of the room and the cubic capacity of space to be allowed per head are described while dealing with bed-rooms under "Grouping."

(8) FLEXIBILITY.—This means making a room, originally designed for one specific purpose, serve other overlapping purposes also. For example, in the houses of small middle class families which cannot afford to employ a cook, the kitchen should be so designed as to serve both the purposes of cooking and dining, even though there may be a separate dining-room in the house. For instance, the school children want their meals served early so as to enable them to attend school on time, or Saturday early movies require that

the evening meals should be taken early. However, either the meals may not be fully ready, or though ready, some finishing touches may have yet to be given to some articles before they are ready to be served. By the arrangement of the kitchen designed to function in both these ways, the housewife can conveniently serve the articles which are ready and at the same time give the finishing touches to the others. As another instance, children require from the first creep to about the fourth year some space for their play, as far as possible under the supervision of the mother, and the supervision is most effective when the child is the least conscious of it. This is possible either in the dining-room or on a verandah adjoining the kitchen, if these are specially designed and located so as to serve these overlapping activities. A house planned on scientific principles must, within a small space, provide for innumerable similar activities such as listening to the radio, child home-work, entertaining guests, relaxation or prayer in a space away from the hubbub of the house, festive occasions such as the arrival of the first baby, holiday dinners, birthday feasts, wedding banquets, religious congregations, and so on—all these and many others have to be provided for within a small space within economic limits, and this is only possible if special attention is given to flexibility.

However, some activities conflict with others. Therefore it is next to impossible to provide perfect flexibility even in large houses. For instance, the child-play is an important and necessary activity, but it is not permanent. Besides, as the child grows stronger and older, its play consisting of running, jumping, playing with a horse, or a railway engine with its whistle or an electric engine with its siren, blind-man's-buff or even a football match, occupies not only the space in the entire house, but the premises around, and sometimes even the streets, and is necessarily noisy and boisterous, and, therefore, what is right for the child is often an annoyance and a veritable nuisance, particularly to the older members of the family who want a calm and quiet atmosphere for their relaxation or prayers.

When it comes to finding out a practical solution, a compromise has to be effected. In respect of the convenience and facility for the children's play, the dining-room or the verandah—should either often adjoin the kitchen—would, with spaciousness and a large window or door at a convenient place, enable the mother to superintend the children's activities. For more grown-up children a large terraced roof with sufficiently high parapet walls, or a safe and strong railing, is an ideal place, at least for 8-9 months of the year.

In respect of other activities, folding partitions are the best solution. They make it possible to meet not only the seasonal, but even the daily needs of the family. I have actually seen a number of houses in France and Germany in which the internal walls were only light partitions, which, having no

structural function to perform were removable, enabling several bed-rooms to be made at night and the same to be converted, by day, into a large hall.

There are two ways to meet the demands of festive occasions or religious or social congregations. One is to combine the drawing-room and the dining-room by a removable partition between them, and the other is to dine in the open air. For this a convenient access should be provided from the kitchen to the yard, or the garden and the space should be screened from the public gaze.

This and the next important subject, viz. Circulation, will be dealt with again along with the discussion in the chapter on "Synthesis of a Home," and a number of practical instances will be given in the plans and commented upon in the notes on the constructional outlines of plans.

(9) CIRCULATION.—In order to preserve the privacy of every room and also not to disturb any member of the household doing his or her work, a straight, short and separate passage is required. This passage which is the means of circulation should be direct and well lighted. Circulation is of two sorts: one, horizontal, i.e. on the same floor, and the other, vertical, or from one floor to the other, either below or above it. As the staircase is the only thoroughfare for the circulation from one floor to the other, the latter is perhaps more important. Again there must be a proper circulation provided not only outside the rooms, but also within the rooms. The latter means that the shape and size of the rooms and also the design and arrangement of the furniture must be considered.

Bad circulation within a room detracts considerably from its usefulness, and if there is no good circulation in a house, much of the pleasure and comfort is lost. It is a criminal negligence on the part of the designer if one has to enter another's bed-room in order to reach a bath-room or his own bed-room. Particularly the sanitary services and the staircase must have an independent access from every room.

In places where there are no drains on the water carriage system, an independent access to bath-rooms and privies must also be provided from the outside for the scavenger.

In houses with five or more bed-rooms, there should be an independent stairway for the servants other than the main one.

(10) PRACTICAL CONSIDERATIONS.—The following few hints in connection with planning will, it is hoped, be appropriate at this point.

(a) Strength and stability, coupled with convenience and comfort, should occupy the first place of importance, and embellishment the next.

(b) Simplicity and effect of strength lend lasting beauty and grandeur to a building, which petty plaster mouldings and vain decorations do not. If a

moulding is cracked or the edge of a corner knocked off, it is difficult to thoroughly repair it. Colours fade away and unless frequently renewed at a great recurring expenditure, the building on the contrary looks ugly.

(c) One should always bear in mind that a house is called an immovable property, and once built, is calculated to last for several generations. One has, therefore, no right either to practise false economy and erect a weak structure which fast depreciates in value requiring continual repairs; or on the other hand, build under false ideas of dignity a costly structure by incurring a heavy debt beyond one's means of repayment.

(d) In the years to come, a man may perhaps have to add a wing or extend some part of the house. Provision for this should be made while building in the first instance, so that some part already built may not be required to be dismantled at the time.

(e) Though a person is at present hale and hearty and perhaps in the prime of his life, while building a new house he should remember that old age with its attendant infirmity is sure to overtake him, and sickness which human flesh is heir to may attack him sooner or later in course of time, as it always does in nine cases out of ten. Hence it is always prudent to have one room preferably on the ground floor designed mainly for comfort which will also be a hospital room for the old and sick members of the family, and in times of health and happiness, will prove to be a luxury. This question has been dealt with while discussing "Grouping" in the next chapter.

6

ANALYSIS OF A "HOME"

IT IS proposed in this chapter to analyse a "HOME" according to its different functions and see what apartments should be allocated, both in small cottages and large houses, to fulfil them.

The word "HOME" connotes far more than a house, giving a mere shelter for protection from the elements. It is a centre of social life; a place of health, comfort and happiness of the entire family in all stages and conditions of life, viz. infancy, childhood, manhood or womanhood and old age—also in health and in sickness; a place where the bodies and minds of the young children are nurtured so as to fit them for shouldering their responsibilities as future citizens and so on. Hence, in order to merit the title of "HOME," it must provide adequately for the following life activities of the family:

Function	Space Allocation
(1) Cooking:	In small cottages, a room for kitchen inside a house. In large houses a cook-room preferably away from the main house and attached to it by means of a covered passage.
(2) Dining:	
(a) Morning tea and breakfast	Kitchen or the adjoining verandah.
(b) School children's meals	Kitchen.
(c) Family meals	A separate dining-room.
(d) Small parties	Combination of dining-room and drawing-room.
(e) Festive occasion	Courtyard or garden.
(3) Rest and Relaxation:	
(a) Conversation	In small cottages, the front verandah.
(b) News and other light reading	Staircase hall or the drawing-room.
(c) Afternoon tea	In large houses, lounge or staircase hall or the drawing-room.

(4) SLEEPING:	
(a) Indoor sleeping in winter and monsoon	Bed-rooms.
(b) Outdoor sleeping in summer	Back verandah or roof terrace.
(5) STUDY:	
(a) Children's home lessons	Front verandah or dining-room in small and a separate room in large houses.
(b) Doing work brought home from office	Bed-room or attic in small cottages. Study-room or library in large houses.
(c) Serious reading or study	Bed-room or attic in small cottages. Study-room or library in large houses.
(6) CHILD-PLAY:	
(a) Confined—as in the case of babies	Dining-room or a verandah close to the kitchen in small cottages, and nursery room in large houses.
(b) Free—as in the case of grown-up children	Roof terrace or courtyard.
(7) STORAGE:	A small store-room attacher to the kitchen, in small cottages, a separate large store-room in up-country houses.
(b) Larder for dairy products	A wall cupboard (with wire gauze shutters in front, and air bricks, behind) in the kitchen in small houses, a refrigerator in large houses.
(c) Cupboards	Wall cupboards in dining-room, kitchen and lobbies.
(d) Closets or wardrobes	Wall cupboards or separate closets in bed-rooms, and front entrance.
(e) Lumber room	A small cellar or separate room attached to out-houses in large establishments.

(f) Coal or fuel	An underground cupboard with shutters flush with the floor in store-room near kitchen or dining-room in small cottages and a separate fuel shed or a cellar-room in large houses.
(8) CONCENTRATION:	
(a) Thinking	An attic-room or a bed-room in the small house and library in large ones.
(b) Prayers or religious worship	A secluded, closed alcove preferably not far removed from the kitchen or dining-room in small houses, a separate small room in large ones.
(9) RECREATION:	
(a) Listening to radio	Drawing- or living-room in small houses. Lounge or drawing-room in large ones.
(b) Boy's handicrafts	Back verandah or a separate shed outside, depending upon the nature of the craft.
(c) Girl's music	Dining-room.
(d) Ladies' needle-work and home-stitching	Dining-room in small houses. The lounge or a separate ladies' apartment in large houses.
(e) Men's hobbies	Allocation of space depends upon the nature of the hobby.
(10) TOILETING:	
(a) General make-up	A corner with a looking glass in the dining-room or ladies' apartment in small cottages, and a separate dressing- or toilet-room in large houses.
(b) Bath-room	A small room adjoining kitchen on the ground floor in all houses, and at least one separate general bath-room on the first floor, room attached to every bed-room in large houses.

(c) W. C. and Urinal		Inside the house one on each floor, if there is a water carriage system available. Otherwise detached one outside the house.
(11) RECEPTION:		
(a) Casual short-time visitors		Front verandah, lounge or drawing-room, according to the status and relation of the visitor.
(b) Guests	....	The front verandah or the drawing-room in small cottages. Guest or study-room or library in larger houses.
(12) DRYING CLOTHES:		Open yard by the side of, or behind the dining-room and kitchen in fair weather season. A few *dandies* hung from the ceiling in the back verandah or dining-room in the wet season in small cottages, and a separate rear yard in large houses.
(13) ENTERING AND LEAVING THE HOUSE:		
(a) Main entrance	....	In front verandah.
(b) Back entrance	....	In the back verandah or kitchen.

In large houses there should be not only a separate entrance for the servants, but also an independent small staircase leading to the lobby.

7

GROUPING OR SYNTHESIS OF A "HOME"

In the foregoing chapter we analysed the "HOME" according to the different functions into various apartments. It is now proposed to show how all these apartments are to be grouped or assembled to make it a real "HOME." Upon the way in which the various rooms or appurtenances are arranged, depend very largely the efficiency, comfort and health of the inmates. This statement is particularly applicable to the smallest cottage. The more limited the space, the more necessary it becomes to utilise, to the best possible advantage, every available inch.

From the discussion in the last chapter it would be clear that the maximum accommodation required by an Indian family consists of the following appurtenances:

(1) A Verandah
(2) A Drawing-room
(3) Bed-rooms
(4) Dressing-rooms
(5) Kitchen
(6) Dining-room
(7) A Ladies' Apartment
(8) A Store-room
(9) Worship or Prayer-room
(10) A Bath-room
(11) A Staircase
(12) A Comfort-room
(13) A Guest-room
(14) A Nursery or Children's Room
(15) A Latrine
(16) A Garage

Detailed discussion of grouping of all these will cover the requirements of families of all grades of society.

(1) Verandah

A verandah, or at least an open terrace, is almost an essential feature of an Indian home as it serves many purposes. Firstly, it is used for keeping shoes, sticks, umbrellas, etc. directly as one enters the house; and also for storing prams and cycles. Secondly, it serves the purpose of a waiting-room for a stranger or a visitor before he is ushered into the reception or drawing-room. Thirdly, it serves as a passage giving an independent access to other rooms of the house, thus preserving their privacy. The fourth purpose is its use for sitting in the evening or by night after dinner, enjoying some light reading or post-prandial talks with friends in a flow of cool breeze. In the cottages of people of humble means, this is often the main sitting-room. The fifth, and most important purpose served by a verandah is that it protects the walls of the house from being heated by exposure to the sun's rays. This it does in two ways: firstly, by sheltering or screening the wall from the sun's

rays, and secondly, by offering to them a buffer or a sort of cushion of air which is a very bad conductor of heat. Thus the air entering the rooms behind the verandah is first cooled down to a considerable extent before it enters the room.

To secure comfort, verandahs on the South and West are indispensable, but if funds permit, they should be provided also on the East and lastly on the North. The latter is rather a luxury than a necessity. If exigencies of money do not permit to provide them on the South and West side, there should be one especially on that particular side on which the bed-rooms require protection from the heat of the afternoon sun, especially in summer. Not only are verandahs necessary on the ground floor, but also on the upper ones.

When a verandah is required only for mitigating the heat of summer, and not for the purpose of serving as a waiting-room, an excellent arrangement is to have a cheap structure built of wooden *ballies,* or posts, supporting a trellis above, on which is trained a vine creeper. The thick foliage which the vine gives forth in summer effectually excludes the sun and cools the hot breeze, and in winter, when its foliage is thin, it allows the warmth of the sun to be freely enjoyed. The vine has a luxuriant growth and if well manured and trained it would cover the trellis not only on the ground floor but on the first floor, also, in a couple of years, and would last for many years.

Verandahs are very often specially placed on the East or South-East, and so designed that they should be flooded with the morning sunshine, and afterwards, when the shutters are closed, the sun's heat is, to a certain extent, "trapped" inside. Such verandahs are called "Sun-traps" and are most enjoyable in a cold climate. The sun's rays have the power to kill all noxious germs and give a healthy and cheerful appearance and purify the air. For this purpose sometimes special "Sunbaths" are constructed in Western countries.

The use of the verandah as a waiting-room is very important. It serves the distinctive function of segregating the private apartments from the entrance area. A number of people will call on you. Amongst them, a few, like postmen, newsboys, pedlars, etc. will be met just at the entrance. There will be a few others whom you want to treat with reservation and formal courtesy and dismiss. They will not be admitted to the living-room. Even those who are welcome and whom you want to treat cordially, will feel embarrassed to find that they were interrupting the conversation of people already sitting in the room, if they were directly taken to the drawing or other private rooms. A verandah, in such cases, serves a very useful purpose.

If a verandah is designed simply for the sake of a passage or corridor, giving an independent access to certain rooms, it need not be more than 3 or

4 ft. wide. Any width more than this for this purpose is a waste. If, however, it is to be used as a sitting-room or a waiting-room, its width should be 6½ ft. as a minimum (although 7 to 10 ft. would be better), in which case one can conveniently spread a camp cot and loll on it whenever desired. Any intermediate width serves neither of these purposes satisfactorily, and hence is practically a waste. There is a disadvantage also from a deep verandah, inasmuch as its roof is likely to darken the room inside and make it look dull and gloomy unless rooflets (also called "gablets") are provided.

A verandah more than 12 ft. wide is uneconomic. In order that a verandah should shade the walls of a building during the greater part of the day, it must not have openings of a height greater than two-thirds of the floor width. For a 12 ft. height it is 8 ft. and for a 9 ft. height, 6 ft.

Seven feet height of verandah near the eaves is suitable, for, it admits the maximum air and light at a low level, and affords shade and ventilation to inner rooms through apertures just below the ceiling level. If the depth of these apertures is restricted and length kept sufficient, they afford better ventilation and more light without admitting the sun's rays. Depth of aperture should be less than the thickness of the wall.

Projecting balconies which are also a sort of verandah, are useful, particularly when opening from a landing of a staircase. After winding up a few steps when one has got a feeling of slight exhaustion, these balconies serve as a resting-place where one can breathe fresh air and enjoy a view of the landscape, and are good in that respect. But when they stretch out from windows in private houses, particularly in an urban locality where houses are not far removed from each other, they do not serve any better purpose than an additional relieving feature in the elevation of the building, which adds elegance to it. It also protects the room inside from the driving rain, which purpose could be equally served by suitable bonnets over the windows. But this is secured at a sacrifice of a considerable amount of money for a small doubtful advantage. From another point of view, they do a positive harm to our neighbours, viz. they seriously interfere with the privacy of the neighbouring houses. No one would naturally like to be watched by his neighbours from a projecting balcony.

(2) Drawing-Room

Every cottage, whatever its size, should contain at least one spacious room, call it by whatever name you like, a "drawing-room," a "parlour" or "a main or living-room." Many and varied are the purposes served by it. Essentially it is a room for relaxation, where every member can lounge comfortably. It is also used as a reception room, and for holding social functions.

It is required to be used as a dining-room on special occasions like marriage feasts, etc., or on holidays when a number of friends are invited to dinner. The drawing-room is required in small cottages for boys and girls of school-going age to study their home lessons. It is at times required to accommodate occasional guests who are never wanting in a middle-class Indian family. It is also required as a congregation room on occasions of some religious discourse or some such festivities, and so on.

The minimum size for a drawing-room should be 15 ft. × 12 ft. But the size should better be determined by the kind of furniture needed. It is a mistake to determine the size first and then buy furniture to suit it. It should be well ventilated and lighted with large windows preferably starting from the floor level. The doors, especially the one at the front and the other at the rear, should have a minimum width of 3 ft. so that pieces of heavy furniture could be easily moved in and out. The position of heavy pieces of furniture such as tables, almyrrahs, suites, sofas, etc., should be invariably shown in plan and the position of wall cupboards, etc. should be accordingly fixed. This simple matter, if neglected at this hour, is likely to cause a great permanent inconvenience afterwards.

Separate spaces should be allotted for different functions and groups of suitable furniture arranged accordingly, e.g. a bridge group should have a bridge table and a minimum of four chairs, a music group formed by a nucleus of either a piano, a harmonium, or a wireless set, a writing group with a desk and one or two office chairs for writing letters, a conversation or smoking group with lounge chairs and so on. Providing good lights and placing them to avoid glare is also of very great importance.

As regards the position of the drawing-room in an Indian home, it is best situated on one side of the house with an entrance from the front verandah. Amongst Europeans, it is usually placed near the front door. In that position it occupies a central place which, though convenient to the style of living of the Europeans, causes inconvenience in Indian families. It interferes with the free movements and actions of the ladies working in adjoining rooms. Amongst Mohammedan and other communities, where privacy in an exaggerated form, viz. *Purdah,* is still in vogue, the drawing-room in a central position causes a positive inconvenience.

Mouldings of any sort, even cornices and skirtings on the inside of the drawing-room, or, in fact, of any room, to give a decorative effect should be scrupulously avoided as they present an ideal breeding-place for germs of disease. The picture-rail, too, is better forgotten.

Very often a wooden board about 6 to 9 inches wide is fixed flush with the plaster surface all round the drawing-room horizontally at a height of 3 ft. above the floor level, and polished well. This is for protecting the plaster of walls which is likely to be damaged by the backs of chairs striking against it.

As far as possible, pegs should not be fixed into the walls at random, some clothing or other is bound to be hung from them, which looks unseemly. If necessary, a set of a few pegs should be fixed to the wall in a corner for the purpose.

Oftentimes the drawing-room of the usual size proves to be too small on some of the special occasions mentioned above. To meet such an emergency, a double drawing hall is sometimes provided. For this, the partition wall extends a foot or two from each side, over which an arch or a beam is built. The space below the springing of the arch is closed by a movable or sliding, thin, wooden partition which can be closed or opened at will, so that one big room can be made out of two.

A skirting of black japan, coal-tar, or a paint of dark chocolate or slate colour, a foot wide all round the wall above floor, not only looks well, but is sanitarily good and allows the floors to be freely washed with a disinfectant in water without staining the distempered surface.

The modern trend is to prefer an outdoor open living-room to a close, congested indoor one. The floor may be either one carpeted by Mother Nature, in the form of a formal or informal lawn, or man-made paved terrace, or even *murum* or mud floor which is serviceable for at least eight months of the year. It should, however, be invariably enclosed either by one or two rustic walls of brick or stone, or hedge-rows or shrubbery, so as to afford privacy from both the public gaze as well as the neighbours. With a ceiling of the sky and a shelter either of a tree or trellised vine for protection against the hot sun, with flowers, foliage and pleasant vistas as pictures, such an outdoor living-room is most exhilarating amidst a cool breeze, even for dining purposes.

(3) Bed-Rooms

These are the most important rooms in a house. One spends more than one-third of his life at rest in sleep here. Amongst Europeans two persons are commonly supposed to occupy one room without constituting a case of overcrowding. Thus if there are 5 or 6 persons in a family, they require a house with three bed-rooms.

It is a pity that on account of the poverty of the people and their ignorance of the importance of ventilation, little or no attention is paid in India to this most vital question. In many places, especially among the poor classes

residing in villages, the number of occupants in a bed-room is determined by the possible number of mattresses which could be spread on the floor from wall to wall in the room. Four, five, or even more persons are in the habit of sleeping in it. Of course, in many parts of India cots or *charpois* (four legged coir-matted wooden cots) are a luxury which even the middle classes cannot afford. In farmers' huts, even young calves and dogs are allowed to occupy a corner of the same room. The one or two small windows (if such holes in the wall deserve the term) that there may be in the walls, are also closed for fear of draught.

Many of the rooms are occupied by more than one family! Before the War the rent of these rooms ranged from Rs. 10 to 12 per mensem in Bombay; the average monthly wages of this class were Rs. 30 per mensem. The result of all this could be very well imagined. The low vitality, the very high death-rate, anæmia, tuberculosis (particularly in females), and high infant mortality, etc. are all directly attributable to the overcrowding in bed-rooms. The farmers who have to work all day in the open field, get pure air by day and thus have this relieving feature partly to compensate for the overcrowding in bed-rooms by night. But the mill-hands and other labourers who have to work the whole day in an atmosphere congested with smoke, and who do not get a chance to breathe in free air even by night, fall an easy prey to disease. In old times, agriculture was the main industry of India, which required the majority of people to do work in the open air, and that preserved their health. In this industrial age, people are leaving agriculture behind them in the villages and are flocking to industrial centres in cities, which have attracted large numbers even from the middle classes who follow pursuits of a clerical or other allied nature. Men go out of doors during at least a part of the day, but women have to spend all their time at home doing domestic work, which has resulted in lowering the general standard of vitality amongst them. It is futile to expect that the children born of such mothers, who are the future citizens of India, would be strong and healthy. Therefore, if India wants to live amongst the nations of the world, she must solve this problem of housing the middle and working classes satisfactorily, and the sooner she does it, the better.

The minimum window area, required by the municipal bye-laws, is one-tenth of the floor area. But the minimum should always be more than one-tenth. In domestic buildings, a minimum of 350 cubic feet of space for an adult and 200 cubic feet for every child under ten, should be made while designing bed-rooms. Besides this, a suitable allowance should be made for every piece of furniture. However, the quantity (square feet of window area) and quality (cross and through openings) of ventilation are of greater consequence than either the floor area, or the cubic space allotted per head.

The above considerations will give some clue as to the size of bed-rooms. From a practical point of view, 15′ × 12′ has been found by experience to be a good size for a bed-room in the houses for the middle classes.† As has already been stated, an oblong room is more convenient, particularly as a bed-room, than a square one, and that no room should be less than 100 sq. ft. in floor area.

Bed-rooms should be placed on the side of the direction of the prevailing wind, and if this happens to be West, the wall on that side should be protected from being heated by the sun's afternoon rays by the provision of a deep verandah on that side. The ideal conditions are that the sun should shine in the bed-rooms for some part of the day, preferably in the morning, and a free breeze should ventilate it by night.

A small bath-room combined with a dressing-room attached to bed-room, is more or less a modern necessity in the houses of the well-to-do. However, in small cottages, it is desirable to so arrange the bed-rooms that the services, viz. bath-room and the w. c. are easily and independently approachable from every bed-room. In the designs given in the following pages, a special attempt has been made in this respect.

Some storage space is absolutely essential in bed-rooms. Portable wardrobes not only occupy some floor space and the cubic content of the room, but it has a top surface which collects dust. Besides it is difficult to keep the cramped space below the wardrobe clean. A cupboard built into the wall is free from all these disadvantages, besides being cheaper. One or two such built-in cupboards in places where they would not come in the way of beds are very convenient. A chest of drawers also could be provided, built into the wall below such cupboards.

Another and still better arrangement is to construct a hollow wall of ply-wood or similar material to serve both as a partition wall and a closet, one such closet could be provided on either side in each bed-room. This is a very common practice in Japan. The rooms in the Japanese houses are literally empty. All their things, including clothing and even bedding, are stored behind these sliding partitions which are often of paper. The Americans have copied this. The closets are sometimes built not in walls but independently in a corner of the room, where if their depth is sufficient, they serve also as dressing-rooms. Details of such closets are given elsewhere while discussing storage space.

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† But if there be efficient cross ventilation through fan lights, even though the doors and windows may be closed by night, a smaller size would do for a bed-room.

While planning bed-rooms, first determine the position of the bed with respect to the windows, so that the bed would be in the path of the cross air currents. In India draft need not be so much feared as in the cold countries. At the most, another position for the bed may be thought of for winter, away from the direct breeze. Other requirements are that the door should be so located that when open the bed will be screened rather than exposed. A single-leafed door is thus more suitable in bed-rooms. Further, there should be adequate space for the bed-room furniture such as a chair, dresser, small table, etc.

The master's bed-room should be spacious enough to accommodate a double bed or twin single beds and, if possible, it should have its own bath-room.

Children of different sexes above ten should preferably have different rooms, one for the boys and one for the girls. Both these rooms, particularly the girls', should be close to the parents'.

(4) Dressing-Room

A dressing-room necessarily requires to be attached to the bed-room. Its size will depend upon the use intended for it—whether purely for dressing or also for secondary purposes (boudoir, study, hobbies, etc.) The main requirement is that there should be ample light. Whether it is daylight or artificial, it should be so placed that it lights the body and not the mirror, as is very often wrongly done. If it be electric or other strong light used at night, it should not come within direct vision so as to cause a glare, but should be diffused. The furniture required in the dressing-room is a dresser or chest, dressing-table with a mirror and a chair.

(5) Kitchen

The kitchen is the most important room in the whole house, because on the cleanliness and the quality of the food that is prepared therein depend the health, comfort and happiness of the family. The improvement of the kitchen, particularly in respect of its planning, equipment, and the materials of its floor and wall surface, has stimulated more scientific research in recent years in the civilised countries of the world than those in any other room. By careful thought it has been made so compact and yet so efficient that it now occupies less than one-third of the space formerly provided for the kitchen and scullery together. The scullery has now altogether disappeared. The mistress or the maid standing in the centre of the small kitchen can reach the various apparatus arranged around the walls on tops of tables and in rows of cabinets provided with trays, drawers, and shelves, etc.

Why should we not have a similar arrangement? Our kitchens at present are the very embodiment of drudgery. Firstly, our cooking range rests on the floor, in which position it does not get any draught of air from the bottom. The result is that a lot of smoke is caused. Usually there is no outlet provided for the smoke and where it is provided, it is not based on scientific principles, with the result that the smoke not only spreads in the whole house and darkens everything it comes in contact with, but oftentimes, if the kitchen is not properly oriented, it enters the eyes of the housewife squatting in front of the *chulla* and makes her drudgery still worse.

Then, again, cooking is done in a squatting posture, which, if continued for a long time, results in pain to the back or loins. For reaching every little thing, the lady has to get up every now and then as there is very little storage space compared with the modern Western kitchen; she has to make unnecessary trips to and fro. Even the sink is not close by to be reached easily from her sitting-place.

Cooking in a standing position, on the other hand, simplifies everything. It necessarily requires the *chulla* range to be installed at a higher level, which allows easy draught of air from below. This arrangement affords a considerable cabinet space below the range, makes the sink very easily accessible and increases the storage space enormously, because cabinets can be arranged all around up to a height of 6 ft. There is a further great advantage in this arrangement, viz., it minimises the risk of the saree catching fire—a tragedy of too frequent occurrence in India which takes a heavy toll of life every year.

I introduced this system of doing cooking-work in a standing position in my own home, and have also persuaded several friends to adopt it, and thus am in a position to speak from experience that though ladies offer some resistance in the beginning to this deviation from the age-old tradition, still after some experience they come round to find great ease and comfort in it.

An ideal kitchen suitable for our conditions and manner of living should be planned on the following basis:

(1) *Location.*—Eastern or N.-E. corner is the best. It will be pleasantly warmed and its air, purified by the morning sunshine entering it, would remain cool during the other part of the day. If located there, it would obviate the smoke trouble also.

(2) *Equipment.*—*Chulla* range, cabinets for storage, sink, work-table, water-storage (where there is no continuous piped supply), and garbage bin are the main equipment, and a refrigerator, in addition, in the homes of the well-to-do.

(3) Plan the space requirements first, providing proper and adequate space for the above in the proper order.

(4) Study the size and shape of the kitchen required in the light of the above and also the space available in the general plan. A floor area of 100 to 150 sq. ft. should be sufficient in normal cases. When definite spaces are allotted to the different equipment, and sufficient storage space is provided, just a small moving space between the cabinets on both sides, say about 4 to 5 ft. wide, should suffice.

(5) *Lighting and Ventilation.*—Light should enter the kitchen in two directions. The window space should be a minimum of 15 per cent of the floor area and the outlook through the window should be cheerful. If Nature has not provided a cheerful view, it should be done artificially by planting a few flowering trees or seasonal plants or at least a few flower pots placed just outside the windows, so that the housewife should not feel cooking a drudgery. There should be cross ventilation provided. The number of doors should not be more than two.

(6) *Floor and Wall Surface.*—The floor should be paved with a smooth, grease-proof material which should remain clean and should be easy of cleaning—polished flagstones are the best. Cement tiles are likely to be stained. Concrete floor polished smooth (Indian Patent Stone) is also good. The joints, if any, should get filled flush with the surface so that nothing collects inside them.

The lower three feet surface of walls should be very smooth, and if not tiled, should be given two coats of paint. The junction between the walls and the floor should be covered or at least rounded. A suitable slope should be given to the floor surface towards a drain pipe for facilities of washing.

(7) *Storage Space*—As much storage space should be provided as possible in the kitchen. A very convenient space would be in the form of cabinets above the level of the table. They should be of a smooth material with close fitting shutters and detachable shelves. The depth of cabinets should not be more than one foot for convenience. The space below the level of the table should be utilised for storing heavy articles, such as jars of pickles, flour bins, large utensils, etc. Even the space above the cabinets up to the ceiling should be utilised for storing articles which are only occasionally required.

(8) *Smoke Outlet.*—Whatever kind of fuel is burnt, unless it is electricity, a smoke outlet is necessarily required. A suitable scientific design is given in the author's *Build Your Own Home.*

DETAILS OF EQUIPMENT.—(a) *Chulla Range.* This will depend on the fuel or heat energy used—electricity, coal, coke, gas, charcoal, fire-wood. But in all cases, it should be on a raised platform about two feet above the floor level.

(b) *Storage of Water.*—Where there is no continuous piped water-supply, water must be stored. This should be at a level a little above that of the sink, and if possible a pipe should be led from it to the sink.

(c) *Sink.*—This should be of a very smooth material—porcelain, stainless steel, enamel, etc., as far as possible without joints. The walls adjoining the sink should have a lining of glazed or polished tiles about a foot high in the portion where water is likely to splash. There should be drain boards, preferably two, one on each side, one for the soiled and the other for the washed utensils. A dish drain, towel rack, a shelf or a recess for scrubbing material, a soap-holder, etc., should be provided for.

(d) *A Garbage Bin.*—This should be below the sink, with smooth surface on the inside, preferably of metal with a close-fitting lid at top.

(e) *A Preparation Table.*—Preferably with plate glass top with a chopper, grinder, cutter, etc., attached and a drawer for knife, spoons, etc.

Other articles of equipment are an armless chair or a light stool, a clock, and a number of cabinets—amongst them one for milk and other dairy products and the other for fruits and green vegetables. These should have shutters of fine wire mesh to exclude vermin and provide ventilation. If these cupboards are in a wall exposed to outside, a few air bricks in the wall would provide efficient ventilation.

Every precaution should be taken to exclude flies from the kitchen, such as providing fine wire mesh, spring shutters to the doors, etc.

(G) Dining-Room

If the kitchen is scientifically planned, even a verandah on the rear side closed with a dwarf wall three feet high and a trellis work above, will serve the purpose of the dining-room in small cottages. When a separate dining-room is to be built, it should be located as near the kitchen as possible to save unnecessary walking. Provision of one or two cupboards and a wash basin in a corner for washing hands after meals makes for great convenience.

A square room is scarcely suitable for dining. If dining is done in the orthodox manner while squatting on the floor, a minimum width of 8 ft. is

required for two rows of diners facing each other, with adequate gangway between for the server. The modern trend in the better class homes is to use a table and chairs for dining. A better way, which is the golden mean between the orthodox and the modern ways, is to use dining-table of 18 inches width in two rows, with a gangway of about 2½ ft. between for the servers. A width of 18 ins. is sufficient for the plate and bowls used for an Indian dinner. These tables could, if required, be joined together and used as a single central table also. If this arrangement of two separate tables is adopted, a convenient width of the dining-room is 12′ 6″, made up as follows: Space behind chairs, minimum 2 ft., space for chairs 18″; space for table 18″, i.e. 5′ on each side, or total 10′, and a gangway of 2′ 6″ in the middle. A room 12′ × 12′ 6″ would very comfortably accommodate eight seats. For ten seats it would be 14′ × 12′ 6″ and so on.

If a single central dining-table is used, the same space for the chairs and the room behind would be required, but instead of two narrow tables and the gangway between, one dining-table placed in the centre would take a space of 2′ 6″ to 3′ 6″, i.e. a width of 9′ 6″ to 10′ would suffice.

If plate glass is fixed on the top, a table-cloth may be altogether dispensed with. Glass is a very clean material and saves considerable labour, and if a paper with colourful floral design is laid below the glass, it creates a cheerful atmosphere in the dining-room.

The windows of the dining-room which should be large, should have large panes. The out-door view should be pleasing to the eye—either natural or artificial, made by suitable landscaping.

The floor should have a very smooth and non-absorbent surface, capable of being easily washed.

In small cottages the dining-room serves many useful purposes. It is the main sitting-room for the ladies, it serves as a children's play-room, also for doing their home lessons, as a room for the girls to practise music, and so on. Hence it is desirable that it should be well-lighted and ventilated and should command a good aspect.

However, in the comparatively large houses of the upper middle class families, as there are separate rooms for the above activities, the dining-room is not much used except for dining, and, therefore, may be reduced in size, particularly if there be an open terrace in front properly screened by means of a hedge or creeper and shaded by evergreen trees. Dining in the open air has its own charms and may be enjoyed at least during eight months of fair weather.

If the dining-room opens into the drawing-room, just a folding screen or a cloth curtain or a folding partition would make a combined room for use on special occasions. The folding partition should be such that the leaves could fold flat against the side walls like a pack of cards.

(7) A Ladies' Apartment

By far the largest part of the day is spent by the ladies and young children indoors. The active man, whose duties for the greater part of the day call him out of doors, soon forgets his fatigue and has his strength for renewed activity more thoroughly restored where a healthy home awaits to welcome him. For those who have to spend more time indoors, either through duty or necessity, the greatest care in all the details of a wholesome dwelling are most essential. The strong man, after free respiration in fresh air out of doors, may pass with immunity through foul or damp air, or sit for a considerable time or even sleep in a close, dingy room. But such is not the case with those who stay at home. Delicate women, youth susceptible to illness, and tender children suffer most.

Then, again, the ladies' apartment is, in most cases, likely to be the lying-in room of the mother or the child's first nursery. All the requirements, therefore, such as sufficient direct sunlight, equable temperature, sufficient air space, with means of constantly renewing the air—requirements which make for health and comfort—should be provided in full measure in this room.

(8) Store-Room

This room or pantry is also a necessity in houses for the middle classes. In very small cottages, roomy wall cupboards and a loft, either in the kitchen or in the dining-room, serves the purpose of a store-room. One or two underground cupboards (described on page 54) would be very much appreciated in small cottages in particular. The store-room should, as far as possible, be situated near the kitchen and should have a stone paving so as to preclude the possibility of rats entering and making their home there. Rats not only do a lot of damage, but also carry on their body the potential danger of fleas affected by plague. The store-room should be well lighted and ventilated, and there should be a row of shelves all round. The lowest row should be at least 9 inches above the floor level so that the floor could be easily cleansed and washed of all dirt. For an ordinary family a store-room of about 10 ft. × 6 ft. should be adequate enough.

In rural districts a bigger store-room is required to store staple food-grains, etc., which are available at a cheaper rate during the harvesting season.

Besides, a fuel room or a coal cellar, spacious enough to store fuel sufficient for the requirements of the four months of the monsoon season, is required in addition.

In addition to this, some space for putting bicycles or a perambulator is very often required in the cottages of the middle-class people. A corner of the front verandah or the space below the flight of stairs is suitable, if the latter be situated not far from the front entrance.

An efficient home must have not only "a place for everything" but also "everything in its own place."

The houses of the traditional type provided a very large space—a big hold-all—both in the basement floor and in the attic or just beneath the sloping roof where one could dump anything and everything—the heavy things could go into the cellar and the lighter ones into the attic. But the modern trend disfavours close and dingy cellars and the flat roof of modern houses deprives us of the attic space also, and hence the problem of storage space arises.

With normal families, there is always a heap of lumber, which, though not quite useful, is not quite useless either, and cannot, therefore, be thrown away—some storage space has to be provided for it. Normally, when we begin to plan a store-room, we have before our eyes the storage of provisions such as wheat, rice, tea, sugar, charcoal, etc., and that is all. In urban districts, the purchases of the provisions are made weekly (or sometimes monthly) and, therefore, a large store-room is looked upon as a waste of space and money. But if we sit down to make a list or an inventory of the things we have actually stored in our house, we shall be surprised to see how many and how odd they are—things which we never dreamt we ever possessed!

Even if we take scrupulous care in eliminating things from time to time as they go on accumulating, still there are a number of things which must legitimately find a place in the home. Here is a small list which is by no means exhaustive:

(a) *Articles of the nature of clothing*

such as overcoats, raincoats, umbrellas, canes, hats, shoes, boots, slippers, sandals, and the entire clothing—formal and ceremonial—both of the males and of the females.

(b) *Articles of the nature of foodstuffs and provisions*

such as wheat, rice, cereals, and other staple food-grains, tea, sugar, condiments, fruits, vegetables, dairy products, meat, eggs, soaps, oils, charcoal, kerosene oil, bread, butter, etc.

(c) *Articles of frequent use requiring a special storage*

such as family medicines; sports equipment, such as tennis or badminton racquets, fishing tackle, golf-clubs, polo or hockey-sticks, guns, etc.; children's toys; disinfectants; house-cleaning equipment such as brooms, brushes, mops, vacuum-cleaners, etc.; daily and special *Pooja* equipment; china; glassware; toilet equipment; tools and implements; utensils and cooking equipment of daily and occasional use, etc.

(d) *Articles of value*

such as jewellery, costly ceremonial dresses especially of the ladies, silver-ware, etc.

(e) *Heavy and bulky things*

such as cycles, perambulators, tents, sewing machine, etc.

(f) *Articles of the nature of "dead" storage*

such as furniture and utility machines needing repairs, travelling equipment, trunks, cabinets, etc.

(g) *Surplus stock*

such as pipes, fittings, books, furniture, screws, nails, pegs, tools, etc.—things not immediately useful but with which one is loth to part.

Definite allocation of storage space must be provided for all the above while planning a home. Those requiring frequent use must be within easy reach.

It is not practicable to state here with precision where and what sort of storage space should be provided for each of the above items. That depends upon several factors such as individual habits, accommodation and nature of plan and so on. It is, therefore, proposed to set down here in a general way the possibilities of providing storage space in a home.

In the kitchen a number of built-in wall cupboards or pre-fabricated removable cabinets could be provided. If cabinets are provided, they should be ranged all around the kitchen, leaving a space in front of windows only. Shelves, trays and drawers could be arranged inside these cabinets.

A large closet preferably with sliding shutters in the entrance or verandah with a shelf with holes for canes and umbrellas, hooks and hangers for overcoats and raincoats, and shelves at the top inside the closet for hats and a mirror in a suitable place. (This arrangement is far better than the traditional hat-stand.) A similar small cabinet about two feet high should be

separately provided inside, but near the entrance, for shoes, sandals, etc., at floor level.

A steel or wooden stand for bicycles should be provided in the motor garage. The space below the staircase should be suitably enclosed and utilised for articles of "dead" storage, and if the staircase is near the entrance, even bicycles and a pram could be stored there below it.

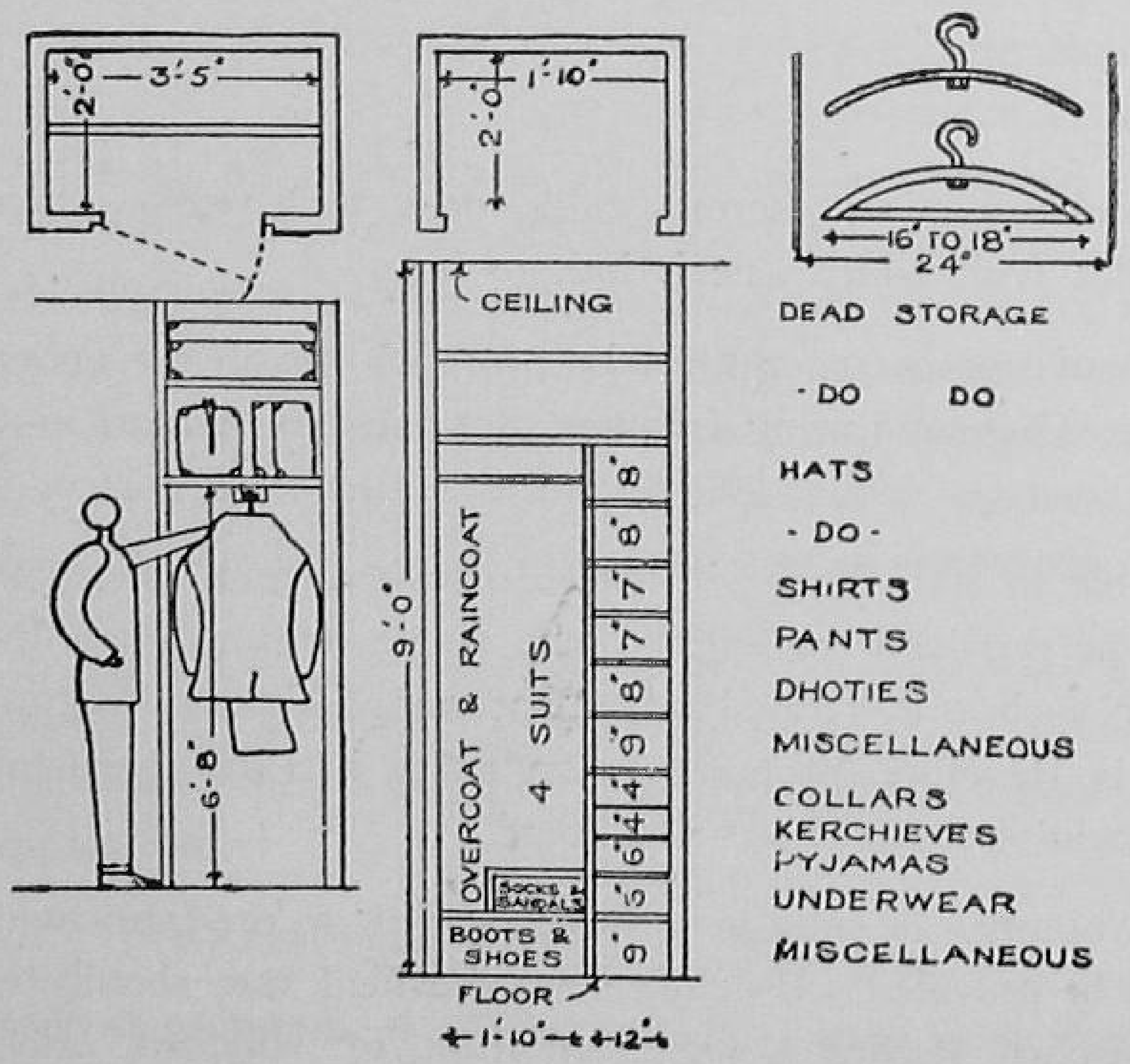
A loft should be constructed on the top of the garage at a height of 7 ft. above the floor level. This would provide considerable storage space.

A small pantry adjoining the kitchen is very handy as a provision store.

Lofts could be built at a height of 7 ft. above bath-rooms and w. c. also.

Built-in wall cupboards could be provided below windows up to the floor level, and if the shutters are of a sliding type, they would not interfere with the carpet while being opened.

Figs. 10, 11 12, 13 14



Similar built-in small cupboards are possible above the doors up to the ceiling for "dead" storage.

Underground cupboards of a small capacity—say 3′ × 4′ × 1½′ deep could be provided in the passage in the centre of the pantry with wooden hinged shutters flush with the floor for storing charcoal.

Closets of plywood or similar material should be provided in lobbies and at every odd corner or a recess that would be available, for accommodating trunks and suitcases at the bottom and family linen, such as bed-sheets, pillow-cases, towels, dusters, napkins, etc., on shelves.

Similar closets for clothes should be provided—two in each bed-room, even at a small sacrifice of some space out of the bed-room, which, considering the convenience they afford, is no sacrifice at all. These closets would altogether obviate the necessity of several fittings in the bed-room, such as shelves, racks, pegs, etc., and if judiciously planned, would serve as sound-proof partition walls as well.

Figs. 10-14 show such closets suitable for bed-rooms. The coat-hangers shown in Fig. 14 on the right-hand side are usually 16″ to 18″ long. So one measurement of the closet (either depth or width) should be minimum 22″, if not 24″. The closet on the left-hand side (Figs. 10 and 11) is 24″ at right angles to the face of the wall and 3′ 5″ wide. The space for overcoats and coats is 6′ 8″ high and above that are two rows of shelves up to the ceiling for storing travelling kit. Figs. 12 and 13 show another closet with the door removed to show the pigeon holes for storing details of clothing.

(9) Worship or Prayer Room

Of late, very few people can afford to devote a special room for this purpose especially in cottages in an urban area, for many reasons. The chief amongst them is that one finds very little time for this purpose in the midst of a modern busy life. Secondly, space is very much restricted; and thirdly, there is paucity of funds for building on any more area than what is absolutely necessary. In the up-country places conditions are more favourable. There is plenty of leisure; site is unrestricted in extent, and the building materials and labour are comparatively cheaper. If provision for this room is desired, it should be situated in a secluded part of the house, free from disturbance of any sort. It should be well ventilated and lighted, but there should be an arrangement to make the room partially dark when required. Slight darkness, particularly combined with seclusion, tends to increase the solemnity which is very much desirable in this room for inducing concentration of mind. An alcove in the dining-room would be quite suitable for this purpose.

If a small special room is to be allocated for this purpose, it should be on the ground floor and not far removed from the kitchen or dining-room, because in the midst of the busy modern life, the duty of the *Pooja*, except when there is a retired member in the family, is relegated to the ladies, who have more time to spare and who are also more religiously minded by nature.

Apart from this space some other quiet, secluded place is normally required in a home for reading, for attending to work brought home from office, and sometimes for discussing some private personal matters between any two

members of the family; or for interviewing an unexpected visitor who, ushered in to the midst of friends or guests being entertained, would feel embarrassed and might also interrupt the mirth and pleasure of the party. A library or a study-room is very convenient for this purpose. But in the absence of either of these, just a small enclosed corner or alcove in which two men can comfortably lounge, will be sufficient.

(10) Bath-Room

The main bath-room should be on the ground floor near the kitchen. If a hot-water boiler is to be kept in the bath-room, a minimum size required for it is 6′ × 10′. If used only for bath purposes 5′ × 8′ is a sufficient and convenient size. There should be two windows in a bath-room—one for ventilation, situated at a height of 6½ ft. above the outside ground level and another at the usual low level with frosted glass shutters for admitting light but maintaining privacy. It is convenient in small cottages to keep the height of the bath-room low (say about 7 or 8 ft.) and to provide a loft above it for storing fuel or any other articles of lumber. The loft should be well lighted and ventilated, and it should have a hinged door of expanded metal to keep rats out.

The Indian way of taking a bath requires some part of the floor (say, 3′ × 3′ preferably that in a corner) to be lower in level by about 3 inches than the remaining and a smoothly dressed stone 15″ × 15″ and about 6 inches high, fixed in the centre for squatting, while taking a bath. The entire floor of the bath-room should have a flooring of polished flagstone slab, and walls all around should be lined with glazed tiles to a height of at least 3 ft. or, if its cost be found to be prohibitive, the floor should be paved with flagstone and the sides with cement plaster coated with a durable and hard-surfaced paint. As far as possible, lime in the form of mortar or calcareous composition of flagstones, should not be allowed at least in the sink or lowered part of the floor, as urine, which contains an acid, acts chemically on the calcareous matter, and unless copious water is poured for flushing immediately after use, it causes a bad smell and also wears the stone away. Even trapstone paving is preferable in rural districts, though from a sanitary point of view a smooth surface cannot be obtained on it so easily. A *nhani* trap should be fixed in the bottom of the sink towards which the floor should slope. In no case should water be allowed to stagnate near the house. It causes not only damp, but also breeds mosquito larvæ.

The provision of a corner-shelf at a suitable place for keeping a soap-box, a towel rack, another shelf 9 inches above the floor level with perforations for draining off water from wet and soiled linen, a shower-tap, if feasible

and necessary, and hooks or a set of pegs for clothing make the arrangements in the bath-room complete.

Whether water is heated in a boiler or in an open copper pot placed on a *chulla,* a smoke outlet is a necessity; still to preclude the possibility of the smoke entering the house, the main bath-room should be located in a place opposite to the direction of the prevailing wind, and should have no ventilators over the doors, opening into other rooms from the bath-room.

Though a bath-room attached to every bed-room is a luxury which only the rich people can afford, there should be, in addition to the main one, a common bath-room, which guests and other occasional visitors could use without encroaching upon the privacy of the family. If bed-rooms are located on the first floor, there should be a bath-room also there with an independent passage to it from each bed-room.

The additional bath-room on the first floor near the bed-rooms is rarely used for bathing purposes in middle class Indian families, for which the general bath-room on the ground floor is normally used. However, it is advisable to provide all the bathing facilities also here for use when a rush is expected on the general bath-room on account of the arrival of a number of guests. This should, however, be essentially planned as a toilet-room and should have, besides all the toilet requisites, a white glazed urinal in a corner. It is a bad practice to use the sink in a bath-room for this purpose. There is a pattern of a urinal in the market embodying flushing arrangement which is very suitable for Indians and useful for both males and females.

It is a mistake to include a w. c. inside a bath-room. It should always be in a separate closet or compartment with an access independent of the bath-room.

In the interest of economy, the bath and toilet rooms on the upper floors should be located on the top of those on the ground floor, and those other on the same floor should be grouped together and not placed away from each other. This arrangement saves a considerable length of drainage pipes and inspection chambers.

A bath-room serving several bed-rooms should not have doors opening into the different rooms, but there should be one door only opening from a common lobby.

The door shutter of the bath-room should be so arranged that when open, it would screen the place where the actual bath is taken.

(11) Staircase

The staircase is the main thoroughfare of intercommunication between the floors and, as such, is of very great importance. But, generally, there is a tendency for people to effect all the economy of space in this particular respect at a sacrifice of considerable comfort and a risk of frequent accidents. If the upper floor is exclusively devoted to bed-rooms, the staircase could be located at any convenient place inside the house. But, if some of the rooms on it are to be used as sitting-rooms as well, which outsiders may occasionally visit, the position of the staircase must be such as will afford it an entrance independent of the other rooms on the ground floor. That is why many people like to post it in the front verandah. If it is situated in the latter place, another staircase on the rear side for the use of ladies will add much to the convenience and privacy of the household.

In order that a staircase may be comfortable it must satisfy the following requirements:

(1) It should be airy and well lit.

(2) The stairs should be easy and comfortable. There are two rules for guidance to determine the mutual relation between the tread and riser:

(a) Tread (or the width of the footrest) × riser (or the height of the step) = 66 inches.

(b) Tread + 2 × riser = 23 to 24 inches.

Note: The limiting dimensions are that the riser or height of step should never be more than 8 inches, and the tread or the width of the footrest never less than 9 inches. 6″ riser and 11″ tread are very satisfactory dimensions; 6½″ and 10″ are the next best. These will be appreciated by old people and invalids who find stairs in general difficult to negotiate.

(3) There should be at least 6½ ft. clear headway above any step.

(4) The width of the stairs in a winding flight should be at least the same as in the straight one.

(5) The stairs should be sufficiently wide (3½ if not 4 ft.) so that two people would be able to stand abreast comfortably and pass by each other. It also easily permits pieces of heavy furniture to be carried to the upper floor. This precept, however, in Indian cottages, is honoured more in the breach than in the observance. Three feet clear inside the railing is the minimum width required even in the smallest cottages.

(6) As a rule, a staircase should not have triangular or winding steps at all. Not only do they tax the ingenuity of carpet layers, but they cause positive harm. Firstly, people going down the stairs are much more likely to slip on the "winders" than on the straight steps, and secondly, if they slip, they fall down a large number of stairs, which is likely to make the fall a serious one. Young children are very susceptible to this in particular. It is therefore prudent to leave no chance for possible risks by spending a few rupees more and altogether avoiding winders *even at the sacrifice of an easy riser.* If for exigencies of space they have to be there, they should be rather at the beginning of the flight near the ground, so that, if a fall does occur at all, it would not be a severe one.

(7) As far as possible the height of the risers should be uniform. A difference of even ½ inch in the height of one single step, though not quite apparent to the eye, is at once susceptible to one's legs and causes one to become startled and perhaps to stumble.

(8) Each flight should have not less than three steps at least, and, as far as possible, the number of stairs in each flight should be uniform.

(9) The staircase should, as a rule, be fire-proof, especially if there be only one.

(10) Not more than ten steps should come together in one flight, otherwise the climbing becomes tiresome. But this may not always be possible.

(11) A staircase just in front of a house gives a poor appearance. Æsthetically, a geometrical staircase (one having three or more flights at right angles to each other, or winding but square) is good. It also affords easy facilities for lighting and its "well," or the central hollow portion, forms a good position for a lift. But it involves a danger in case of an outbreak of fire, as it provides an air chamber and a sort of chimney which causes the conflagration to spread. Moreover, it totally blocks the descent under those circumstances. A winding staircase, if centrally situated in a house, affords the best means of ventilating the house, and simplifies air-cooling.

(12) As far as possible, the staircase should start in a separate lobby even though small.

(13) The railing should be quite simple in design so as to facilitate cleaning. A dwarf wall at least 3 ft. high, of brick or concrete, or, at least of wooden framework with ply-wood panels, is attractive, simple and economical.

In flats and tenement houses in particular, unless there is a separate emergency exit, the staircase should necessarily be fire-proof.

In large houses a separate staircase, although a cramped one, with its upper landing in a lobby for the use of servants is necessary.

(12) Comfort Room

You may be strong and stout, and your entire family enjoying excellent health at the time of building your house; but you should not lose sight of the rainy day too. There is every chance of yourself or some one of your family falling sick some time in the future. Again, it is likely that there might be some aged or infirm person in the house dependent on you—why, you yourself cannot escape old age in course of time. Hence it is prudent to have in view one room mainly designed for comfort of the aged and the sickly, which can be properly called a "hospital or a sick room," but at the time of building a new house in the expectation of health and happiness, the word may sound rather inauspicious or freakish, hence, to follow M. Coue and make it *suggestive,* let us call it a "Comfort Room." For being really comfortable, it should satisfy the following requirements:

(1) It should preferably be on the ground floor to save the sick or the aged person the trouble of going up and down the stairs. If there be any lift for the purpose, then the first floor, which is healthier, is preferable; still there should be an easy staircase in addition, without any winding steps, for use in times of a possible break-down of the lift.

(2) A bath-room and a W. C., where there is a water-carriage system, or a commode arrangement where there is a conservancy system, should be quite close to it, preferably in an ante-room.

(3) The room should be so situated that it will be flooded by the morning sunshine, and will also get a free breeze by night. A south-east corner would be appropriate for this reason, with a verandah on the south.

(4) In the cottages for the middle classes, it should not be far removed from the kitchen, so that it would be possible for the ladies to attend or render prompt service especially to the aged who are usually not in need of constant attendance. Still, it is advisable to have another room, close to the comfort room which an attendant could occupy if and when necessary.

(5) There should be windows for ample light and a thorough ventilation, with blinds for obscuring light whenever necessary. Most sick persons find strong light unbearable.

(6) The room should be rather commodious; 15′ × 12′ is a good size, but that depends upon the size of the cottage to be built. The floor should be of such material as will permit of easy washing and cleaning with a disinfectant.

(13) Guest-Room

A spare room even in a small cottage is welcome at all times. Not only can it accommodate an occasional guest, but it can be used for a number of other purposes as well. For instance, when there is no guest, it can be used as a library or a hobby-shop or for any other purpose which requires a quiet atmosphere conducive to concentration.

The ideal place for the guest-room, if the budget permits, is in a separate, detached guest-house, with a small verandah and a bath-room, or at least a toilet-room attached to it.

If this is not possible, a room inside the house itself should be allocated. The special requirements of this room, besides being well lighted and ventilated, are that it should be, as far as possible, independent of other rooms except the drawing-room (into which it may open), and the front verandah, and that it should have an independent access from it to the general bathroom and w. c. unless a special toilet-room is attached to the guest-room. Further, it should be sufficiently commodious to hold a bed, a writing-desk and a chair, and a davenport or at least a chesterfield chair.

(14) Nursery or Children's Room

A child is the most cherished member of the family—be it rich or poor. A home without children is no home at all, it is a dreary wilderness.

Nowhere is the right to enjoy perfect health to be more jealously guarded than in the nursery. The neglect of sanitation here saps the cheerfulness of childhood and ruins all the fair prospects of youth.

Children thrive best with free and frequent access to the outer air and light; so any arrangement that makes it difficult for children to get out into the open should be avoided.

By far the great majority of middle class families cannot afford to allocate a separate room for the nursery. However, some space for the child is very necessary, and, as far as possible, it should be under the eye of the mother working in the kitchen. In such small houses, therefore, a room or even a verandah adjoining the kitchen would be very suitable for this purpose. The floor of this room or verandah should extend so as to form an open terrace for use when the child requires a larger space. Those who are favoured by fortune to do so, should set apart the best room in the house for the exclusive use of the children. It should have a very efficient system of cross ventilation without causing a perceptible draught. The light should be sufficient, but not such as would cause a glare.

In order to be cheerful, the nursery should have a sunny aspect, with large, low windows and a cheerful outlook. The windows should project beyond the walls so as to form small balconies with hollow concrete boxes at the ends in which flowering shrubs could be grown. There should be a strong and safe railing round the balcony at least three feet high.

It is in the nature of active childhood to be noisy and often boisterous, which should not be checked. The door should be provided with double shutters, if necessary, so that their noisy activities would not interfere with the comfort of other inmates.

It is a wrong notion that because a child is small, a small room should suffice for it. It is, in fact, just the opposite. The child is very active, it breathes much faster, it spends nearly twelve hours or even more out of twenty-four continuously in the bed-room, and as its tissues are continually undergoing growth and development, it requires a larger quantity of fresh air.

Sleep—"Nature's sweet restorer"—is very essential for the child and should be undisturbed even by day. For this purpose, the bed should be shielded both from light as well as from noise.

The chairs, tables and other furniture in the nursery should be of special design to suit the requirements of the young child; the tables should not be more than 2′ high. The stooping habit and "short-sight" are contracted by the child for want of properly designed chairs and desks. Even if the child has to play, let it arrange the toys on the top of a low table and play with them either standing on the floor or sitting in a low chair. Those who can afford a separate nursery room can certainly afford to provide the above amenities.

Coloured pictures protected by varnish against dirt and moisture should be hung on the walls just above the top of a dado 3 to 4 ft. above the floor so as

to be within easy reach of the child. (By the way, children love bright colours.) The dado should be of a darkish colour—say dark grey, slate, or dark chocolate, so that children can draw figures with a chalk stick, as if on a blackboard, at their will. The surface of walls should be finished with light cream, primrose yellow or light blue.

Our first notions of home start from the nursery. With the above elements of comfort, children should be made to feel that food, rest, quiet and pleasant ease belong to this place, where nothing but ease and love would be expected from the ever-greeting mother. This kindly attention with orderly, clean and cheerful atmosphere, not only makes childhood happy, but leads to strength, good nature, trust, courage, efficiency, character, and virtue.

(15) A Water Closet and Toilet Room

In cities and large towns, where underground drainage is constructed, the w. c.s can be flushed with water and as they remain free from noxious smells they could be built close to, or even inside, the house. Still, they should be separated from the adjoining rooms by means of a small lobby or at least a blind wall.

In country districts and small towns, there is usually ample space round buildings, and therefore either earth closets, or water closets combined with septic tanks* are very suitable. The days of latrines on the basket system are now numbered, firstly, because the system has been found by experience not to work satisfactorily on sanitary principles, and secondly, because the sweeper class is being awakened rightly to a sense of self-respect and to their rights as human beings, and would give up the scavenging work in the not very distant future. Earth closets are very easy to maintain in a clean state, and yield a very valuable manure. Their only disadvantage is that they must be outside the house, though they may be quite close by.

Septic tanks can now be very cheaply and efficiently constructed. If the water-supply is sufficient, the closet can be built even inside the house, and if the supply is meagre, it is advisable to build it like an earth closet outside, though quite close by. The requirement of a septic tank is that there must be an open space of at least 10′ to 15′ × 50′ (depending upon the nature of the sub-soil) available near the house.

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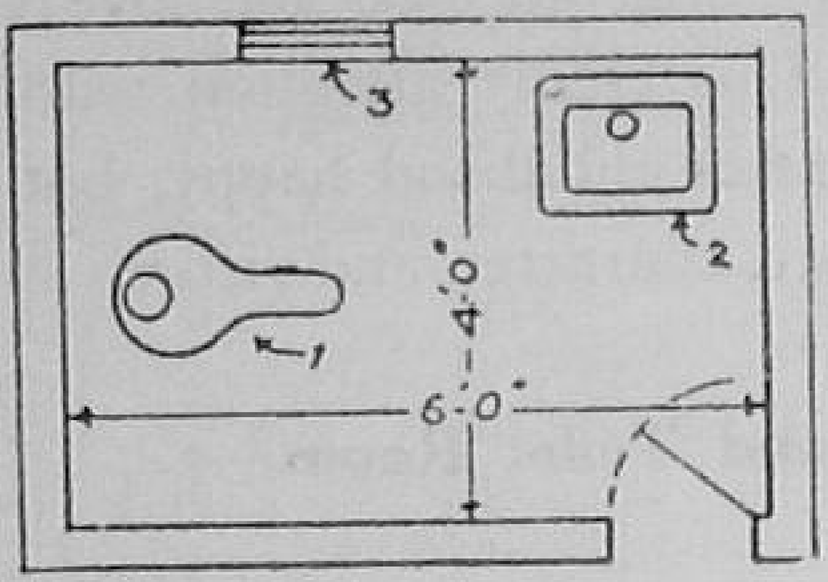
*The subject of disposal of domestic sewage in various ways has been treated in detail in the author's *Build Your Own Home*.

The minimum space required for a w. c. is 2½′ × 4′, and if a lavatory basin (either of pedestal or wall-bracket type) and a shaving mirror are to be provided in addition, the minimum size should be 4′ × 5′. However, this makes the toilet room very cramped.

Figs. 15 and 16 show a small closet with all the necessary conveniences provided in a space of 6′ × 4′ without a cramped effect.

Fig. 15



1. W. C. seat.
2. Pedestal type lavatory basin.
3. 2′ × 1′ window at 5′ above floor.
4. Shaving mirror.
5. Glass shelf.
6. Tumbler-holder.
7. Soap-box.
8. Tooth-brush holder.
9. Towel rack.

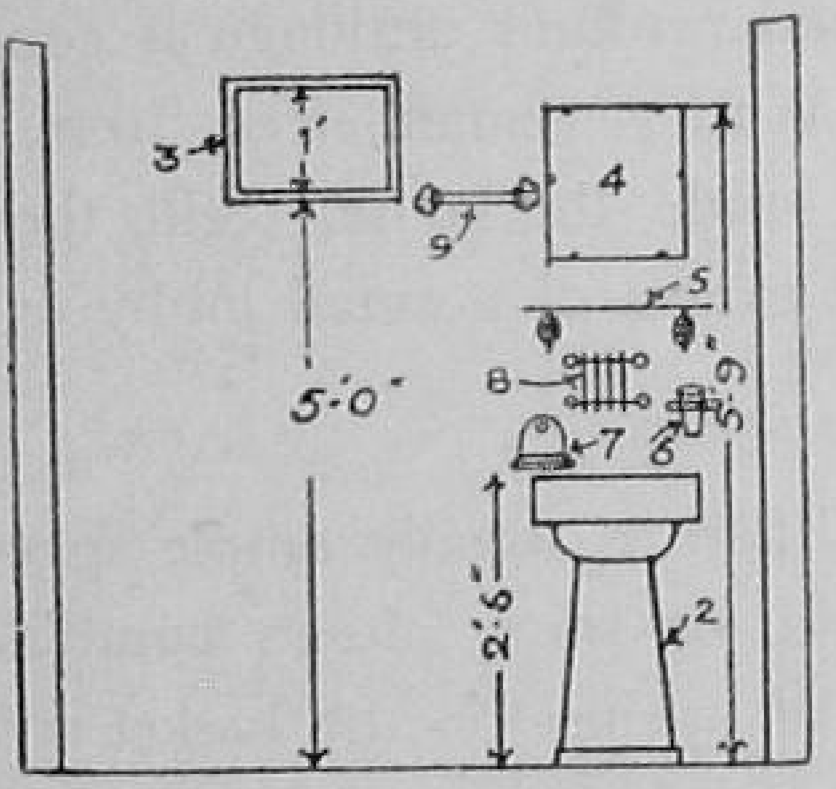


Fig. 16

Strictest privacy is required in these rooms not only in respect of sight, but also of sound. The former can be achieved by so swinging the door-shutter (which should be single-leafed) that when open it should screen the seat. Sound insulation can be effected by constructing the partition walls of a hollow type.

The artificial lights provided inside the bath and toilet rooms should not be direct, but diffused by means of an opaque bulb or opaque glass cover.

(16) Garage

Man is conservative by nature. Just a few years ago in the days of the horse-drawn coach, in order to save the house from the smells and flies due to the dung in the stable, and the tramping noise of the horses, the stable was logically built away from the house in a corner in the back yard. Even though the automobile replaced the old horse-drawn coach, we still build our garage

in the same corner. But, as the motor-garage is free from the nuisance of flies and smells, and also from the noises of tramping, etc., we have now come to realise, though late, that if the garage is built to form a part of the house, not only would it not cause any nuisance, but on the contrary it would be a great convenience, because one need not, in that case, have to walk over in rain to reach the garage. Secondly, being quite close and handy, one can look to its and the car's upkeep much better, and thirdly, after a return from shopping, the mistress can bring in the purchases directly from the car into the kitchen. For the latter purpose, the modern trend is to build the garage near the kitchen and to provide a door from it opening into the kitchen or into the back verandah, if the automobile is owner-driven. A garage built inside the building is much cheaper than one outside because it saves one or two walls.

There is a possible argument against this practice, viz. that as the automobile contains inflammable petrol, there is the risk of the house catching fire. But, of late, buildings in concrete are mostly fire-proof, and if a few special precautions be taken such as providing cross ventilation and avoiding the use of a combustible material like wood in the construction of doors and windows of the garage, the fear can be minimised.

By building the garage as part of the house, so much space in the driveway is saved, which could be utilised in extending the garden or utility area.

In America, various devices are employed for automatically opening and closing the door of the garage from outside. One method is to focus a beam from the head-lights on an "electric eye" on the outside of the garage, which operates a lever to open the door. Another method is to transmit a code word by short waves from a radio installed in the car itself, which secures a response from a receiving set inside the garage and a switch is automatically operated. In the third method, the driver operates by hand while seated in the car itself a switch placed alongside the drive-way and the switch works the gear; and so on.

The modern trend of the automobile design is to increase the length of the wheel base, though the width of the car (or the length of the axle) has remained practically the same. The minimum inside dimensions of the modern garage are, therefore, 8′ × 18′; 9′ or 10′ × 20′ would be ample to provide for future designs, if space is restricted.

Ordinarily, more than 7 ft. height of ceiling is not required for a garage. It would, therefore, be in the fitness of things if a loft of fire-proof material is constructed above this height in the garage for dead storage.

8

"MODERN" ARCHITECTURE

It is very difficult to define "Modern Architecture," because it claims no characteristics of its own beyond being simple and in harmony with modern ways of thinking and modern ideas of hygiene. Nevertheless, when we say "Modern Architecture," we do not merely mean the present-day architecture, but a certain definite style of architecture rationally related to the circumstances of modern life. Whatever the critic may say, nobody can gainsay that modern architecture is full of life and energy.

It was not more than thirty years ago that a group of continental architects such as Le Corbusier in France, Behren and Gropius in Germany, Oud and Dudock in Holland, McKintosh in Scotland, Frank Lloyd Wright in U. S. A., and others in other countries, almost simultaneously started a revolt against the meaningless ornamentation of the various traditional styles or orders of architecture, and initiated an altogether new style, almost revolutionary in character, against the debased practice. This new movement got a stimulus in the post-war times. The drain of wealth during the Great War of 1914-18 caused such economic pressure that people were left with hardly the barest means of maintenance. All the new houses which came to be built after the close of the war were absolutely plain structures, providing just a shelter from the inclemency of the weather. People could not afford to spend on ornamentation. This acted as a powerful incentive to these architects who, in spite of the gradual improvement in the economic conditions, continued a wide propaganda with great vigour, provoking thinking amongst people on a rational basis. The movement was dominated by the personality of the great artist and propagandist, Le Corbusier, whose revolutionary ideas, expounded with merciless logic in a series of articles and books, aroused the whole world to a revolt against the traditional architecture. Here is his extreme theory: that the so-called "architecture" does not exist, only "functions" exist. The "art of building" is a misnomer and should be replaced simply by "building"—that the architect, like the engineer, is concerned only with the organisation of functions without any regard as to whether the result would be beautiful or otherwise. That only a "well-being" exists in the sense of a building which functions with the minimum expense and maximum profit. That a good house is that which proves a good merchandise, and so on.

A large number of people all over the world were attracted by this theory in the beginning, but most of them soon found that it could not be applied con-

sistently in practice. No architect of the first rank now practises pure functionalism. One good thing, however, came out of this movement, viz., that it emancipated the architect from stylism.

As another cause of the rapid development of modern architecture may be mentioned the advent of novel materials and new inventions. Amongst them, Ferro-concrete might rank first. This new, pliable material has immense possibilities which have not yet been fully explored. It is now possible to support large buildings on thin pillars a long way apart. *Chajjahs,* canopies or verandah roofs can now project a long way with a single support. *Jalis* or grilles of various ornamental designs, which were very costly, have become very simple, if made of concrete. Leak-proof terraced roof, which is an outstanding feature of concrete buildings, has now come within easy reach of the middle classes. Not only does it look more elegant, but it also provides double space—inside the house, as well as on the roof—either as a roof garden or as a place for sitting or sleeping in the open air for sixteen hours at least out of the twenty-four, which is a great blessing in a tropical country like India. The massive brick or stone walls can now be displaced by thin walls of R. C. C., thus making a saving in money and in valuable space.

Colourcrete cement, which is a material of very recent introduction, has been further helping in enhancing the beauty of modern buildings.

There is plywood and other similar thin sheets, which, though all of them are not so suitable in a tropical country like ours, enable us to cover large surfaces without extensive frame-work. They can be used for facings of walls also. There are, besides, several new materials such as chromium and stainless steel which successfully resist atmospheric influences. Then come the neon-lighting tubes and glass. The latter, the cleanest material, has come into universal use, not only for panes, large window-sheets, table-tops, etc., but also for furniture, walls and staircases. Bakelite, again, is another material manufactured in various pleasing colours by a synthetic process, which like glass is acid-proof, smooth, and clean, and yet lighter and more elastic. It is used at present for locks and handles of doors, electric fittings, etc., but has bright prospects in future for more universal application. Several other new materials can be quoted which have played an important part in altogether revolutionising the conventional architecture.

The *Esprit Moderne* essentially consists of functionalism and simplicity and devising new methods of construction to suit new materials. Functionalism is the quality in a building of being nothing but itself, i.e., maintaining or asserting its own individuality. A steamship, an aeroplane, or an automobile

is beautiful not because of the elegance of its shape but because it is most adapted to its purpose. Similarly, a building must possess functional beauty. A school building, for instance, must look like a school and must provide all the conveniences of a school and, as such, must possess a style of architecture of its own, quite different from that of a hospital, of a residential building, of a hotel, of a railway station, or of a palace. This principle has a very wide application in modern architecture. The exterior of a building is logically determined by the plan, i.e., the interior arrangements which are considered first strictly in relation to their function or purpose. Every little thing, whether in the exterior or interior must justify its existence of that particular place. Whatever materials are used, the construction is allowed a free and honest expression and no attempt is made to disguise it. No ornamental devices are allowed either in the interior or in the elevation, unless their existence is dictated by the necessity of its purpose in relation to structural elements. The architect has to make the most of proportion and mass and must bring out beauty by adopting simplicity of shape, balance, and grace of outline. He must make the whole building into a sort of pattern, and in this pattern no necessary things should come amiss, and no unnecessary things should find a place. For example, the tendency of the old fashioned architects was to conceal a chimney stack or a water tank by placing it in the midst of a turret; or conceal even the roof behind an ornamental parapet wall. The modern architect would show these boldly and make perhaps new, interesting, and real special features out of them in his pattern.

Traditional architecture concerned itself with two things: (1) adopting symmetrical fronts and (2) copying Nature. Both these do not appeal to the rationally minded modern architect. He laughs at the idea of providing a window or a staircase at great expense on the right-hand side, not because it would serve some useful purpose or is dictated by necessity, but only because there is a window or a staircase on the left-hand side with which it should balance in the front elevation. He views it from the points of economy and purpose, and as neither of these is served, he rules it out altogether. His argument is that copying Nature may be all right, but that it should not be done blindly. That even Nature is not blind but rational. It is true that most animals present a symmetrical front. But there is some special object of Nature in doing so, viz., if one of the important organs gets out of order or falls into abeyance, there should be another to do the function. Again, if it is argued that symmetry is adopted to copy Nature, then why do so only partially, i.e., with respect to the front only? Nature is thorough, because if a median line is imagined in animals, the functions allotted to all the members on the right-hand side of the body are, in most cases, similar to those on the left-hand side

also. Thus, not only two eyes, two ears, two hands and two feet are provided symmetrically, but also two lungs, two kidneys, etc. Again, if we are out for copying Nature, why restrict ourselves to the animal world only? The plant life tells quite a different tale. We find there that Nature is distinctly opposed to symmetry. The trees set forth branches at random; no two leaves or even petals of a flower are alike, in fact there is nothing stereotyped in Nature; on the contrary, she is fond of a rich variety, and the latter is the result of varying circumstances, different environments, through which Nature's product has passed. Why should we not, then, adapt our architecture to suit new ideas of design, new materials, and new methods of construction?

With the onward march of science, our very ideas of living and the entire outlook of life have changed. With greater facilities for travel and communications, we are determined to enjoy our lives and free ourselves from subordination to our surroundings and narrow limits of the old-type home. Woman is fast being emancipated from age-long drudgery resulting from haphazard planning. She no longer exists for the sole object of running a home. Servants have become a problem and we have to depend more upon ourselves. Thus, though we demand spaciousness, we also want freedom from encumbrances—from furniture and trappings that are difficult to clean. A compact home, amongst hygienic environments with a number of labour-saving devices, which would make it easy to maintain, is the cry of the day.

We have for generations been false to the fundamental principle of true and good architecture, viz., truth and fitness of purpose, until the advent of modern architecture. It is only when we enter the garage that we are in contact with reality for a short time. So many changes have taken place in our food, dress, habits and social customs, so many new discoveries and inventions have been made such as railways, telegraphs, telephones, television, gramophones, radios, electric appliances, aeroplanes, air-conditioning, etc., that our entire outlook of life is metamorphosed, and still, if one of our eighteenth century ancestors were to descend from heaven amidst us, he would see the same architecture and the same methods of construction as he was practising!

To revert to the subject of new construction, piling bricks or stone on top of a foundation for walls is now relegated to the past. The modern architect supports his floors and roofs on thin pillars a long way apart, making the walls serve as panels or partitions with no structural function to perform. For insulating them against sound or heat, he devises means with new materials, and thus he is able to provide very large window surfaces in the panels for admitting light and ventilation which the old-time architect regarded as structurally impossible.

The modern house is judged by its utility and convenience, by the comfort it provides and the success with which it meets with our needs, and not by its superficial decoration. If designed on strict principles of modern architecture, it also fits into the surrounding landscape of which it becomes part and parcel.

It will be seen from the above discussion that the assertion sometimes made that modern architecture represents a complete divorce from traditions is altogether wrong. Rather, it is more in keeping with the fundamental principles of true architecture than the conventional architecture which we have long been accustomed to. It certainly does break with false conventions and debased practices.

Modern architecture does not stop at altering the fabric of the house, but its influence extends to the furnishing and decoration also. Chairs, tables, beds, etc., of very plain, simple, unobtrusive design, but nevertheless cheaper, stronger, more comfortable, and more sanitary, because harbouring little or no dust on the plain unornamental surfaces, have come into common use. The furnishing is determined by common sense—which is the essence of good taste and by fitness of purpose—which is the basis of all sound design. The evolution of the modern kitchen in the Western countries, so as to be more efficient with less labour, is also the direct result of the move towards the new architecture.

Modern architecture seems to transcend not only the limitations of time and space, but even national traditions and bias. It is not the property or patent of any particular body or any one nation, but a universal art offering boundless scope for development.

Modern architecture is most suited to our country. In the first place, it is in keeping with our philosophical ideal, viz., "plain living and high thinking." Secondly, in a land of sunshine, with the contrasting effect of light and shadow, clear-cut features with smooth, sweeping curves present a more effective appearance. Thirdly, plain, smooth surface (whether in the exterior or interior of the house, on walls or furniture, which is one of the characteristics of the modern architecture) allows much less chance for dust to deposit itself in a tropical country like ours; and, lastly, it is the architecture of the masses, because with the growing development of the indigenous cement industry, cement promises to be even cheaper, and the other material, viz., the aggregate, especially sand and gravel, required for concrete, can be had merely for the collecting in the countryside. Thus the modern architecture caters equally for the needs of the rich as well as of the poor. It is up to the architects to rise to the occasion and make the most of the opportunities which are hidden in the womb of the immediate future.

In order to be able to approach the problem of exterior treatment with some degree of understanding, it is necessary to know some of the fundamental principles of architecture which will be discussed briefly here.

Truth and Honesty.—These come from (1) the use of sound materials of substantial size and good workmanship. No bending, shrinking, warping, cracking or leaking should be in evidence anywhere—not even in inconspicuous parts and (2) fearless and honest expression on the outside of what it is inside. No camouflage, no masquerading for what it is not, no shams and pretensions like plaster imitations should be allowed on any account.

Proportion is one of the fundamental principles of architecture. There is a definite relationship between the size and shape, or the length, breadth and height of a structure. It is very difficult to define that relationship. But the eye and hand, accustomed by tradition and tuition and trained by practice, can easily determine the just and exact proportions, and the mathematician afterwards tries to reduce them to rules. For instance, a single-storeyed building with flat roof looks squatty, but can be improved in appearance by providing a tiled roof on it with good slopes.

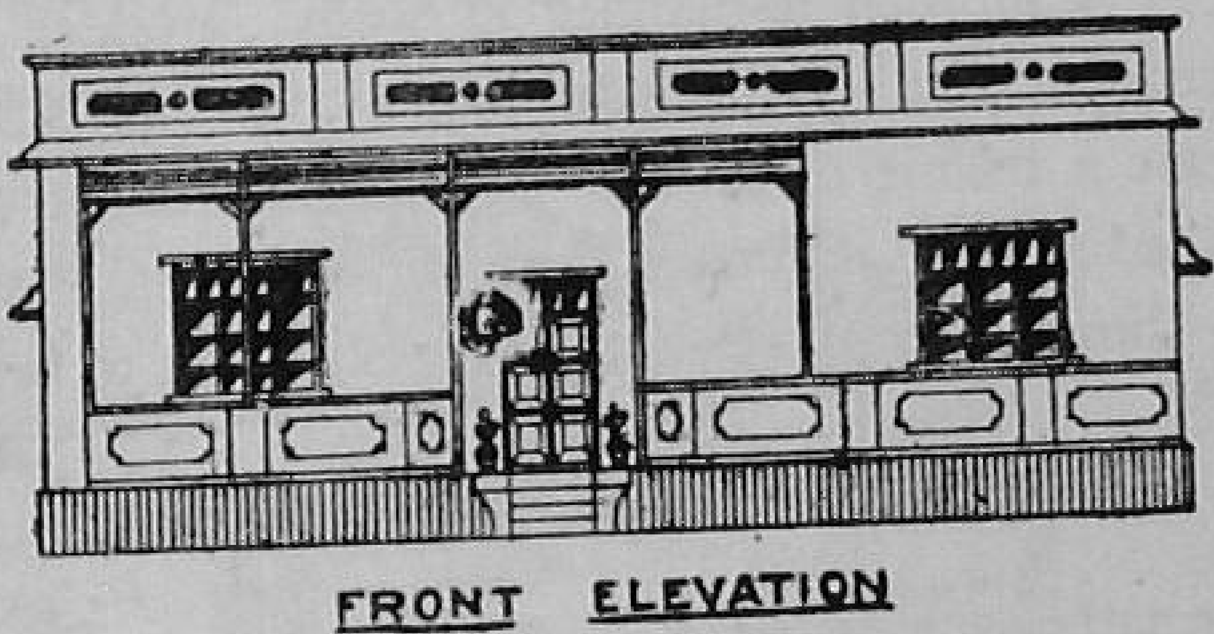


Fig. 17: Greater length than height.

Another way of improving the proportion of low buildings is to construct a basement floor, and if that be not required or not feasible, even increasing the height of the plinth would considerably help in increasing the scale of height.

If, on the other hand, a building is too tall in proportion to its width, it should be so built that the broader side should face the street, and if this be not possible without sacrificing convenience, the effect of height can be considerably toned down by constructing an earth terrace in the front and on the sides of the building almost to the height of the plinth, and planting grass on it.

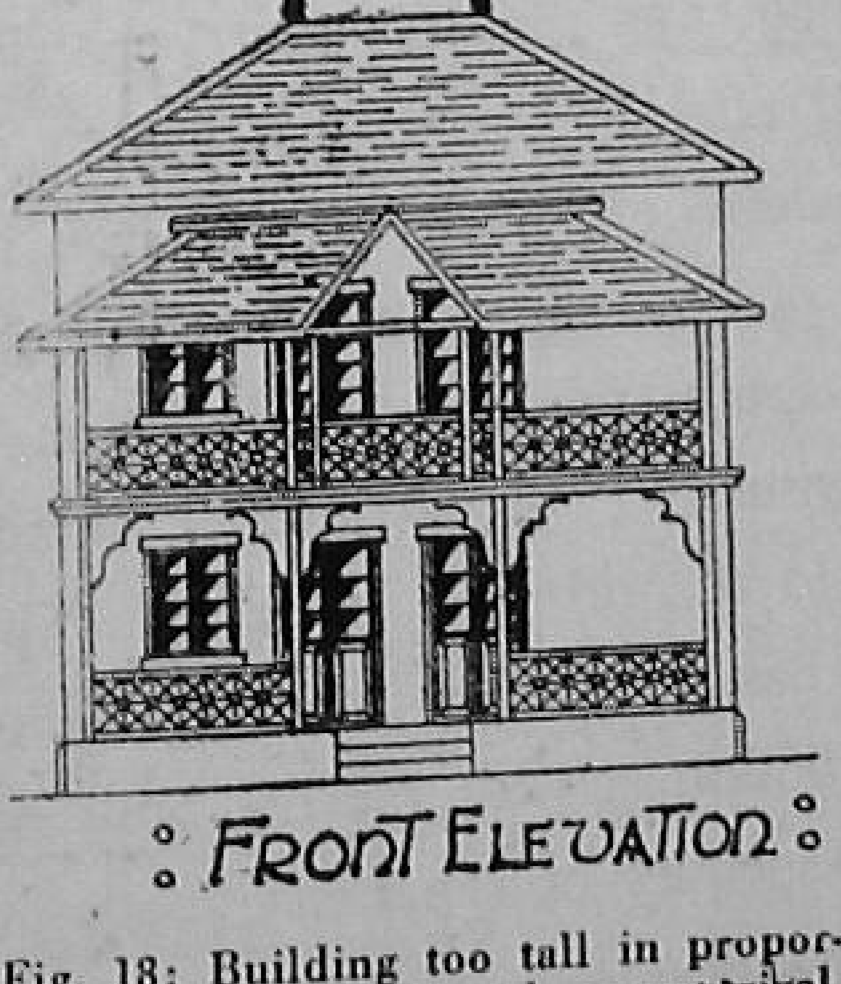


Fig. 18: Building too tall in proportion to its width, though symmetrical.

Balance is a principle which expresses itself in a feeling of repose, as a result of stability and permanence. There are two kinds of balance—the structural balance is based on the principle that the stronger part should always bear the weaker. Structural balance manifests itself in the proper size and spacing of columns, height and size of chimney, etc.

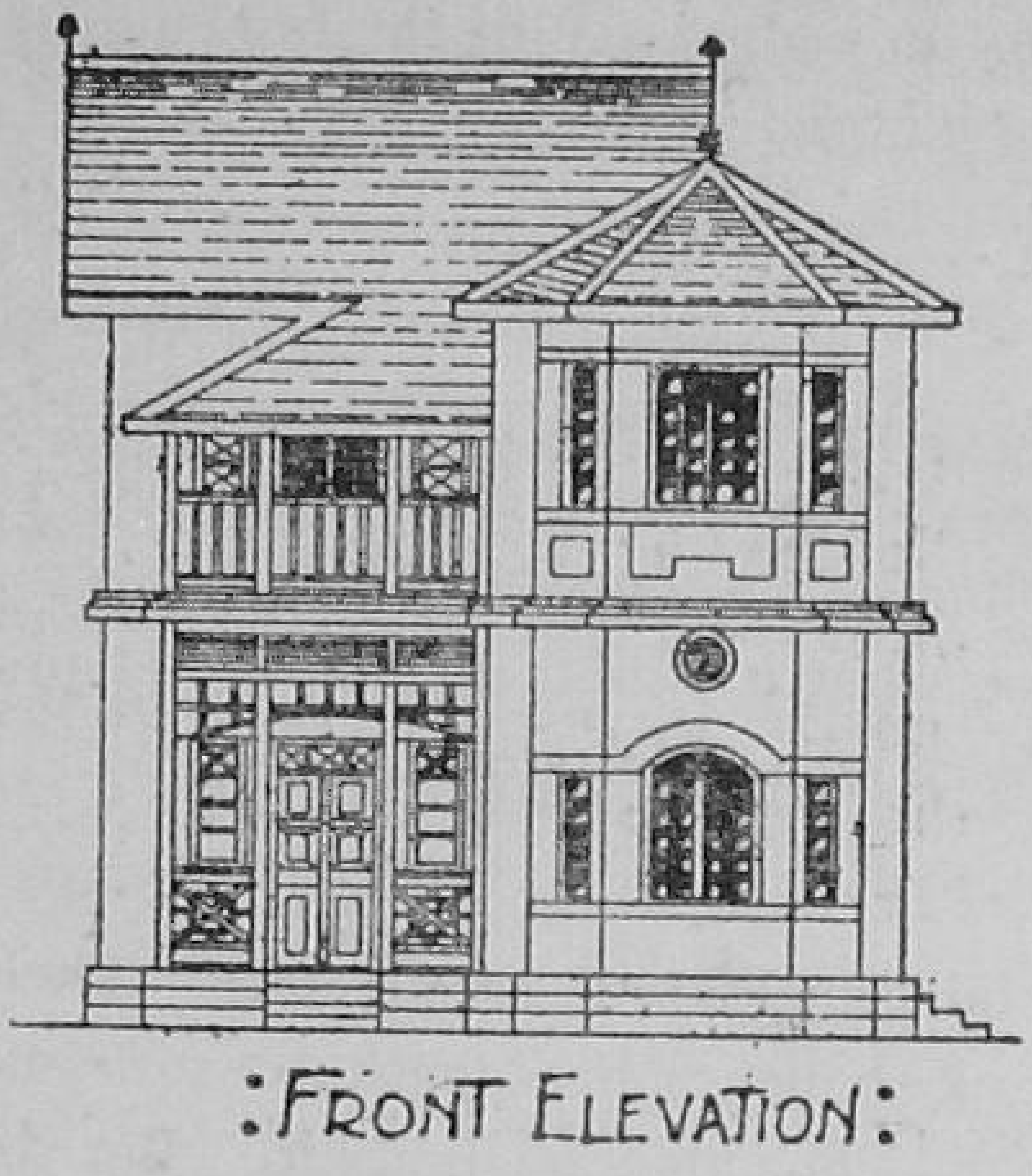


Fig. 19: A badly proportioned and unbalanced building creating the uncomfortable feeling that a high wind might blow it over.

Balance in mass has a relation between the "solid" surfaces presented by walls and roofs called the "mass" and the "hollows" provided by the door and window openings on the exterior facade. For a balanced effect, the mass must be arranged on both sides of an imaginary axis in such a manner as would produce an effect of equilibrium and consequent rest. Otherwise, like a pair of scales unequally loaded, it would create a feeling of unrest—of dissatisfaction in the mind of the on-looker. Attached garages, porches, bay-windows, etc., add masses which must be carefully thought out in relation to the elevation to bring about a balanced effect.

Balance in mass may be either symmetrical or non-symmetrical. Symmetry, no doubt, gives a soothing effect, but, at the same time, it is attended with a feeling of dullness and monotony, and tends to exercise a depressing effect. It does not appeal to the modern architect, particularly in respect of domestic buildings which demand certain freedom of expression—of informality. It is further antagonistic to the principle of truth. The author has in mind a number of domestic buildings with facades built on strict principles of symmetry, both on the ground- and first-floor, having all the windows of one size and design though

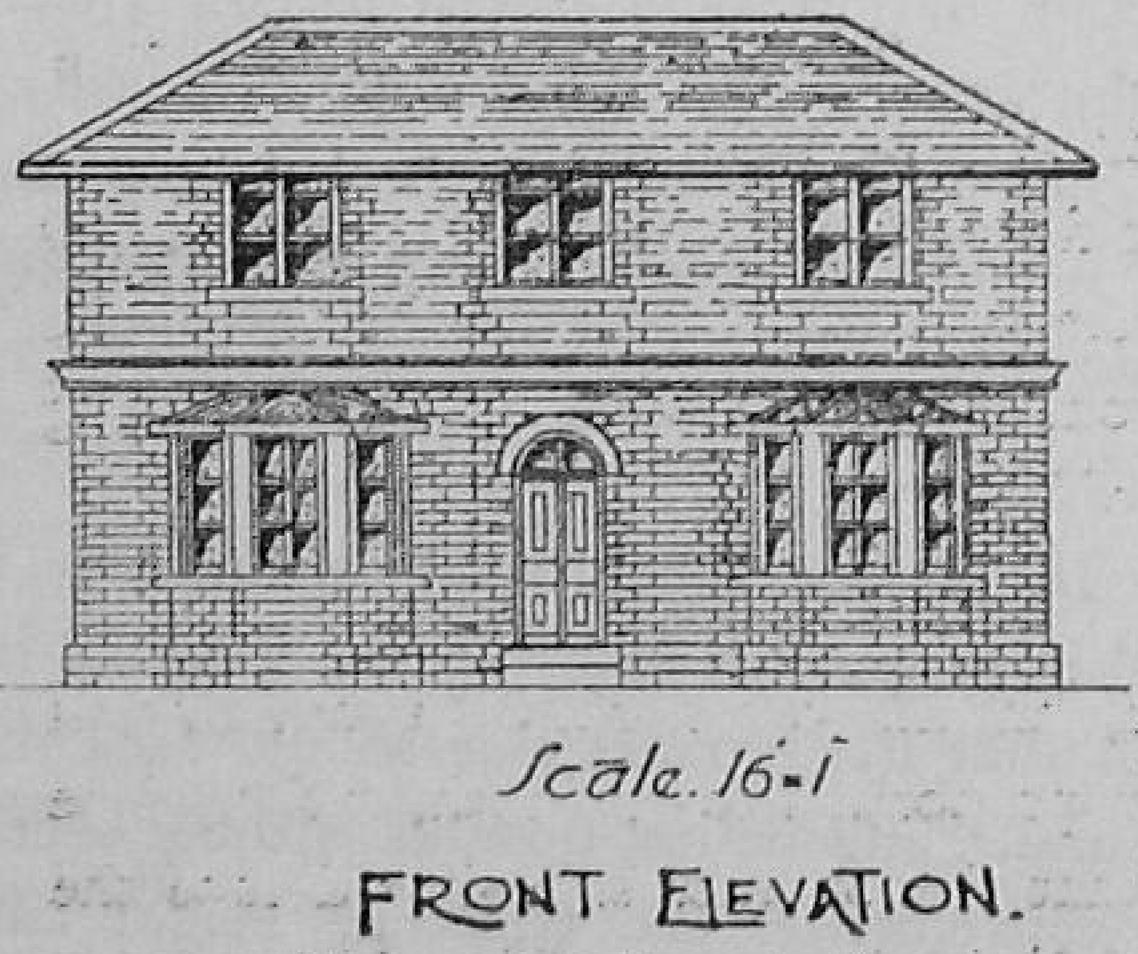
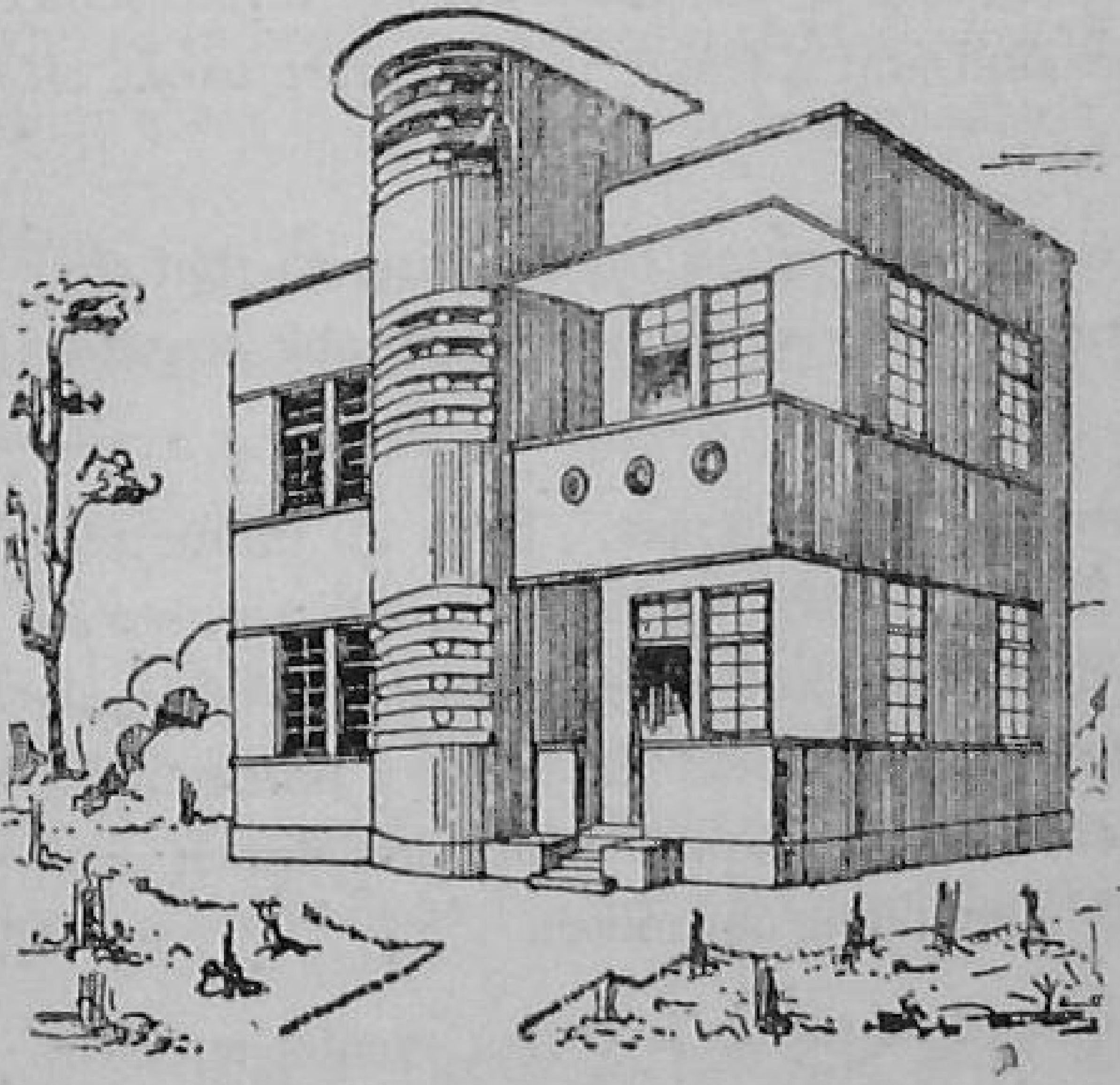


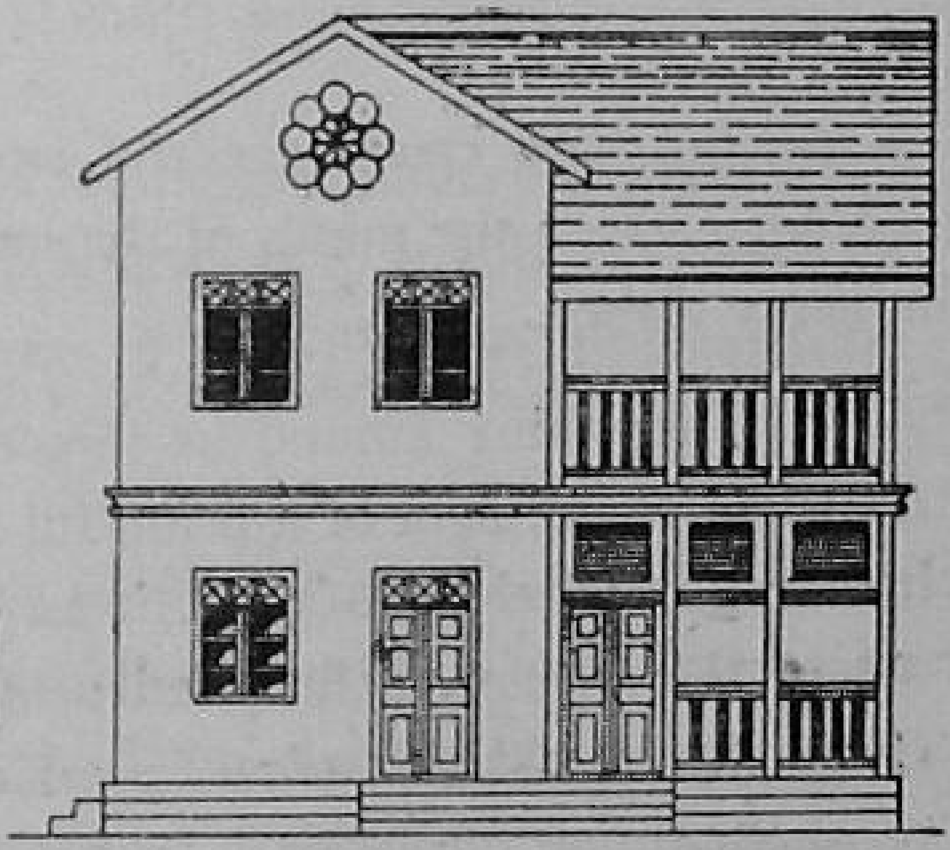
Fig. 20: A perfectly symmetrical and balanced house giving a soothing appearance.

the rooms behind them must be used for different purposes—some for sitting or sleeping and some for culinary or sanitary purposes.

Fig. 21: A non-symmetrical, but perfectly balanced and proportioned building.

Harmony is an effective blending of parts, often very diverse in themselves, into a rhythmic and consistent whole. It is analogous to the harmony of music. Harmony is destroyed by introducing details of various unrelated styles of architecture into one dwelling or unsuitable ornamentation or discordant colours. The various forms, such as the square, triangle, circle, etc., have each their special fitness, but their improper combination produces a discord. Harmony in colour is discussed elsewhere in this volume.





Figs. 22 and 23: Two unsymmetrical, but perfectly balanced and proportioned houses.

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LANDSCAPE GARDENING

Landscape gardening is the art of planning the drives, walks, lawns, gardens, shrubs, flower-beds, etc., so as to form a beautiful setting for the building. This subject is of equally great importance as the architecture of the building itself. The plants and plantings are subject to frequent changes, but the garage and other buildings, and also the drives, walks, and shady trees will remain, in all probability, as they were first planned. Hence, landscape gardening demands a careful thought at the hands of persons of good taste and training, and must be planned together with the building.

Landscape planning assumes a special importance in cities, because the plots are small and valuable and therefore every inch of the ground must be utilised to the best advantage.

The purpose of landscape planning is two-fold:

(1) To design such surroundings or settings as would accentuate the particular attractions of the house in the eyes of the passer-by, just in the same way as we provide a suitable background and a frame for a picture to set off its art.

(2) To create cheerful environments round the building so that they should react on the minds of the inmates and give them a pleasurable sensation at every glance.

Everything around us directly affects our senses. Even an infant feels delighted at the sight of a beautiful flower. When we hear a melodious note we involuntarily feel pleasure, if it be discordant we feel displeasure. We glance out of the window a hundred times a day. Should the scenery be beautiful, every glance will give pleasure which, when multiplied a hundred times, must prove an important factor in favourably moulding our minds.

The modern trend in the civilised countries is to lay greater stress on utility consistent with beauty rather than on beauty alone. Thus it is customary to plan the front yard just to provide a sufficient foreground and to form a good setting for the building, and to plan the backyard more elaborately so that the family can derive pleasure amidst cheerful surroundings and full recreational enjoyment there, in the midst of the privacy afforded by it from the highway and the by-way.

The subject is so vast that it is not possible to do even partial justice to it here. Hence it is proposed to enunciate a few main principles only.

THE FRONT YARD.—Cleanliness and a neat, tidy, and well-trimmed appearance of everything, particularly in the front yard, goes a long way in creating a soothing and restful impression at first sight.

While planning the landscape garden, cost of maintenance should not be lost sight of. The treatment, particularly of the front yard, should be simple and beautiful by the general artistic lay-out rather than by ornamentation difficult to maintain.

Though it is necessary to specify the minimum distance between the street edge and the building line, the exact minimum should not be adopted. A slight variation is desirable to break the monotony.

Any enclosed area appears larger than the same if open, because with definite boundaries all round it forms a unit whereas an open area forms a part of the larger space around it and, by comparison with it, looks smaller.

The horizontal angle of vision for objects at close quarters is about 45°, and so in order to command the full view of the width of a building, the minimum space in front must be at least equal to the width of the building.

The vertical angle of vision is less than the horizontal and, therefore, tall buildings need deeper front space than their height so as to enable the passer-by to have a full view without lifting the eyes to see it as a single architectural unit.

There should be a shady tree or one or two shrubs round the front corners and not in the middle. In this position they provide a sort of a frame to the picture of the building, and soften the hard junction between the vertical lines of the walls and horizontal line of the ground.

It is a mistake to plan the home in the centre of the plot, especially if the latter be small, because by placing the building on one side of the axis the space left on the other side can be very usefully employed either for beauty or utility.

The entire atmosphere around the domestic residence should be homely and informal, and, therefore, a strict observance of symmetry in the landscape design is not desirable, particularly on small plots where the effect of crowding of details due to symmetry would be more marked. However, there should be a sort of balancing effect brought out in the front. For example, if there

be a thick hedge on the left-hand side of the plot, instead of leaving a blank on the right-hand side, it should be balanced by a shrub or an arbour.

The main entrance of the house, which is the centre of main interest in the picture of the building, should not be placed on one side, and if considerations of convenience require it in that position, then another feature such as a bay-window on or near the other end, or a group of windows in the remaining area, should be created to balance the facade and divide or distribute the attention on a larger area.

PLACEMENT OF THE GARAGE.—The garage, with its concomitant drive-ways, is an important factor in making or marring the landscape effect of a yard; so its position in the plot must be carefully considered.

If it be placed too far towards the rear there are three disadvantages:

(1) Much space is wasted in the drive-way.

(2) The distance for backing the car to reach the street and reverse the direction is too long on a small plot, which cannot afford to provide a "Y" turn near the garage.

(3) It interferes with the privacy of the back yard, which is very essential to the family needs as an outdoor sitting place on a lawn or under a shady tree, by the movements in or out of the present day class of people as motor drivers, who should be kept at a distance.

If the garage is built on a side close to the building, it interferes with the light of the rooms opposite to it. Therefore, a position for it on one side just behind, or a few feet overlapping the back end of the building is better.

A still better position is inside the building on a side, with a room or terrace on its top. This effects a saving in one or two walls and also of ground space as part of the walk can be joined to the drive.

If the garage is built on one side of the plot, a minimum distance of fifteen feet has to be left between the building and the plot boundary—3 ft. for the hedge, one foot for a grass strip, 8 ft. for the drive-way and 3 ft. for shrubs in the front corner between the house and the drive-way.

DRYING YARD.—Every family normally requires a space to accommodate a minimum length of 50 ft. line of clothes for drying. The space behind the garage is very suitable for this as it is inconspicuous and compact—just 4 or 5 close rows of galvanised steel wire stretched in a space of 10′ × 5′ are quite sufficient.

TERRACES.—A terrace of roughly-dressed stone slabs, laid in earth, with wide joints for grass to grow on, is suitable for more natural surroundings, e.g., near a pool of water or next to the lawn. If neatly-dressed paving slabs are laid in either cement or lime for the terrace, the latter proves very useful close to the house as an outdoor sitting place or play-ground for children. A terrace, after all, is a connecting link between the house and the out-door life in the garden. An open terrace close to the house should invariably be shaded by a tree or a row of trees.

LAWNS.—Lawns are not so successful in a tropical country like India as in the Western countries where they remain fresh and green all the year round. A well-trimmed and properly maintained lawn is an expensive luxury, but whenever one such is made and maintained, it is very pleasant and cheerful to look at; it proves an excellent broad space for out-door enjoyment, a play-ground for children, and the object of pride for the whole family. If its purpose be for the recreational enjoyment of the family, it should be constructed on the rear side with high boundary walls, hedge or latticed fence for seclusion and privacy from the neighbouring plots. It should be in one long stretch unbroken by any shrubs, walks or even flower-beds. If any details are desired, they should be arranged on the edges, but not in the middle. If a walk must be provided across the lawn, it should be made of roughly rectangular slabs laid in soil with wide joints so that the grass growing in the joints maintains the continuity of the lawn. For real enjoyment the lawn should be as spacious as the plot of ground will permit. If a lawn is only intended for the sake of beauty, and not for an outdoor sitting place, it should be in the form of a sunken panel of grass.

HEDGES.—Hedges of evergreen plants give an air of cheerfulness to the surroundings, and afford very good privacy, but the minimum thickness for the latter purpose is three feet. A long, unbroken stretch of hedge emphasizes length and serves the purpose of an excellent background for the flower-beds. Hedges are the least expensive of all the plantings in a landscape garden. There are a number of evergreen shrubs suitable for Indian climates, which make an excellent shrubbery hedge, though some of them take considerable space even though the shrubs may be planted in two staggered lines. A single line of shrubs scarcely affords the necessary privacy. If economy is desired in the hedge space, latticed fences of steel wire, reed and similar material, or trellis-work of split bamboos, or teak wood with creepers of evergreen variety trained on them are recommended. They occupy less than six inches of space.

If a shrubbery is planted to form a hedge, the corner shrubs should be slightly larger and taller just to break the monotonous, wall-like effect in long stretches.

PLANTATION OF TREES AND SHRUBS.—The trees and shrubs for the plantation must be selected with due regard to their graceful form, ornamental foliage, and the correct height when fully grown.

Trees and ornamental foliage provide shade, serve as a frame to the picture with the building as the central *motif,* screen objectionable views, and produce background and skyline effects. Hence, if the plot is narrow, those intended to frame the house should be planted almost on the boundary lines, and if wide, near the lines of projections of the side walls of the building. They should never be planted in front of the building unless the depth of the front yard exceeds forty feet.

Shrubs provide a three-fold purpose:

(1) To make a pleasing connection between the sharp, vertical lines of the corners at front of the side walls and the flat, horizontal ground line.

(2) To serve as a border and screen along the boundaries.

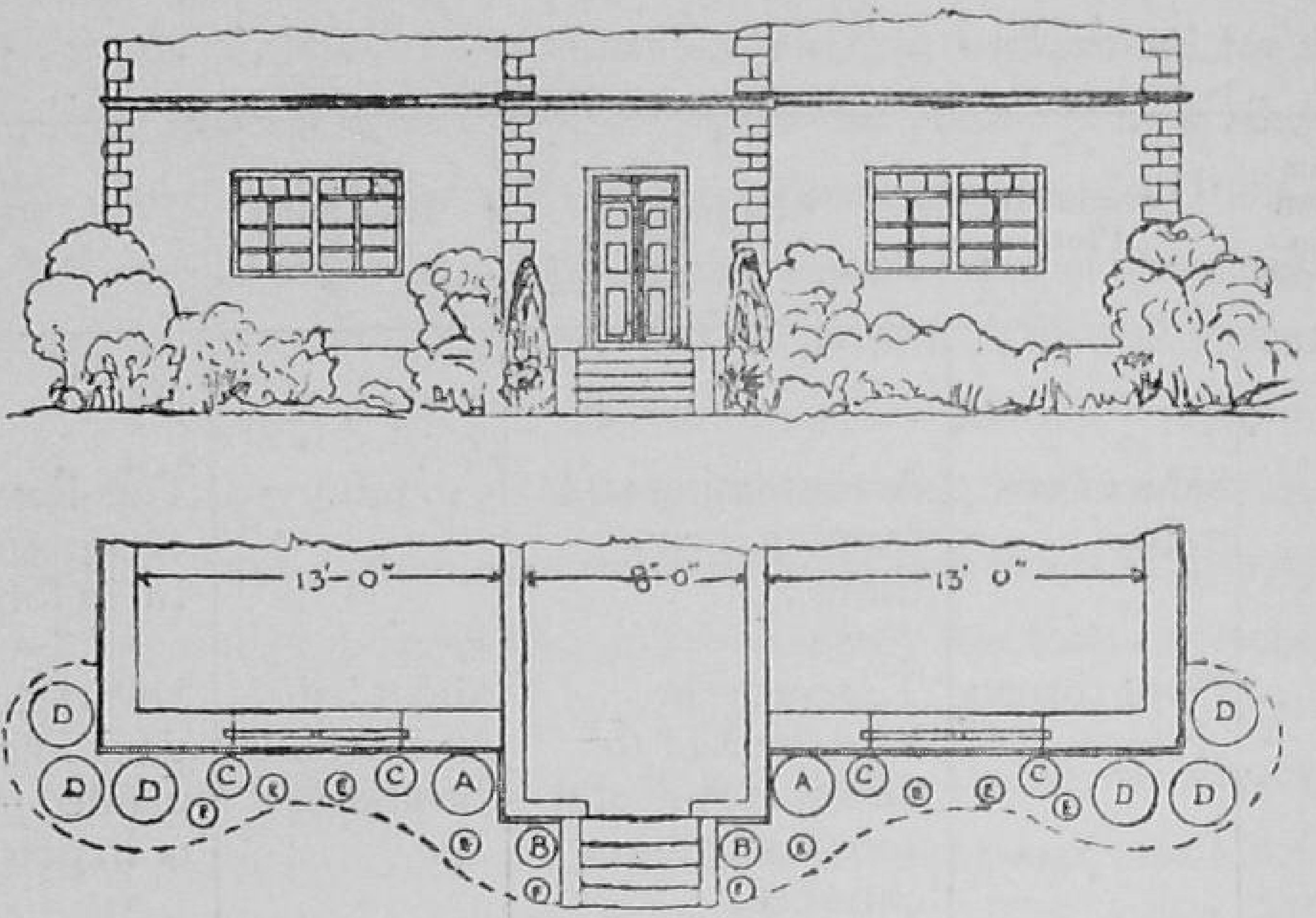
(3) To give the plot the appearance of an independent unit, separated from the surrounding ones.

The following table gives some details of the shrub plantation necessary in a landscape plan:

Reference to Location Shown in Figs. 24, 25	Location in Plot	Purpose	Height When Fully Grown	Remarks
A-A	Sides of entrance	Accentuating and framing the entrance.	5 to 6 ft.	Fine-leaved bushy evergreen, graceful in form.
B-B	Front corners of steps.	To screen the bare stems of the shrubs at A-A and accentuate the entrance.	About half the height of the above.	Dwarf shrubs with thick foliage either planted in ground or in pots.
C-C	In front of windows.	To soften the view presented by the plinth masonry, if the latter be rough and unattractive.	To reach a few inches below window-sill.	
D-D	Corners of house.	Accentuating the sides and making a pleasing junction between the house and ground.	5 to 6 ft.	Clusters of two or three evergreen plants with large leaves and thick foliage.
E-E	In the front space between the entrance and corner.	For edging the planting.	1 to 1½ ft.	Dwarf shrubs or evergreen creepers.

If the plinth masonry be of fine-dressed stones, the plants C-C should be in groups or clumps, at intervals, to expose the plinth masonry to view between the clumps. The width of plantation from the face of masonry to E-E, the edging plants, should be 3 ft.

The plantation of shrubs mentioned in the above table is shown in Figs. 24 and 25 in plan and elevation.



Figs. 24 & 25: Showing plantation of shrubs in front of a building.

A large variety of plants is not in good taste, particularly in small yards. The entire composition should be dominated by two or three varieties only, not far different from each other in colour, which then serve as a simple but definite background, and then a number of other varieties may be used in small amounts as a sprinkling to emphasize the general scheme.

FLOWER-BEDS.—The flower-beds should never be in narrow strips of 2 or 3 ft. as is usually done. A minimum width of 5 ft. should be adopted. The mass effect of flowers is very striking.

Flowers look better from a distance, particularly when a suitable background of a hedge or a creeper is provided. Therefore, they should not, as a rule, be planted in small isolated plots at close quarters. Edging flower-beds by a controlled dwarf hedge of a colour to match, gives the garden a polished appearance.

An ideal place for flower-beds is on the side of the house in front of the living-rooms so that they present a cheerful appearance to the inmates peeping through the windows, and also to the passers-by looking from the street.

The walks between the flower-beds should have a minimum width of 4 ft.

The proper arrangement of the flowering plants with respect to their height, background, and colour so as to form a most pleasing design is the key to the success of a flower garden.

Every garden-lover wishes to possess plants that bloom all the year round. There are a number of such perennially blooming plants, but they do not satisfy all the requirements. Some of them are too tall to be used except on boundaries; others have a rank spreading growth, and, therefore, are not suitable for flower beds; still a few others have flowers which possess an unpleasant smell, and so on. But even these bloom more in one season than in another. It is, therefore, advisable to make a list of plants blooming in the three different seasons, viz., the monsoon, the winter, and the hot weather, and to plant them in inter-beds overlapping each other inside a large flower-bed in such a manner that when the bloom of the monsoon variety begins to ebb away, the winter flowers should begin to appear in the inter-beds either in the front or behind, a suitable colour combination having been previously thought out.

ACCESSORY DETAILS.—There are a number of accessory details which lend a charm to the landscape garden, such as fountains, statues, seats, pergolas, arbours, summer-houses, bird-rests, bird-baths, pools, sun-dials, etc. Most of these, particularly fountains, statues, summer-houses, and pergolas are not suitable for small gardens. If they are to be used, they must be thoughtfully designed. More stress should be laid on simplicity and graceful form rather than on decoration. A massive but comfortable concrete seat is cheap and almost permanent. It should be screened by a tree against afternoon sun, and for preventing it from absorbing heat and radiating it after sunset. In respect of privacy, it should be secluded from the neighbouring plots by means of a high hedge or a brick or concrete wall and should be so placed as to command a view of the best part of the garden. In short, it should be inviting.

A pool serves several purposes. If elegantly shaped in design and properly framed by means of flower-plots, etc., it is a centre of attraction. It affords a storage of water for plants. It may also be used for growing water-lilies. Thus it proves a great asset to a landscape garden even in a small plot. Care must, however, be taken to see that the water is frequently renewed and that no mosquitoes are allowed to breed.

VEGETABLE GARDEN.—Scarcely a house-owner may be found who does not want a vegetable garden, even though a small one, on his plot. But he

need not be disappointed. By good planning, it is possible to reserve a small space for it even on a small building plot. It should be remembered that for the normal needs of an ordinary family even a few square feet of space, with vegetables growing therein all the year round, is sufficient if well manured and cared for. It is a fact beyond doubt that our food—whatever be the province—is deficient in green leafy vegetables which are very necessary for the proper building up of the body. We could at best grow this stuff for our needs even on the smallest plot.

Fresh vegetables which are full of vitamins, are very wholesome and appetising. Moreover, vegetables grown in one's garden, particularly with one's own labour, carry a special relish about them, and, therefore, it is worth while trying them on the part of every property owner.

If a building plot is long and narrow, a portion on the extreme rear of its full width could be very easily utilised for this purpose. If it be short and wide, a long but narrow strip on one side behind the drying yard may be set aside for that purpose. The vegetable garden may be profitably surrounded by a hedge with creepers which yield vegetables, such as beans, pumpkins, snake-gourd, etc. Some of these creepers yield fruit perennially for the kitchen.

10

INTERIOR DECORATION AND COLOUR SCHEMES

Colours exercise a powerful influence on the human mind. Physiologically, they act upon the optic nerves through the media of our senses. People in robust health may not feel their effects immediately, but the weak, the invalid, and the sensitive are very susceptible to their influence. If they are in harmony, a sensation of cheerfulness and pleasure is produced. If, on the other hand, they are discordant or harsh, irritation of nerves, even amounting to headache, is the result.

The psychological effect of colour on the human mind is perhaps more important than the physiological reaction. It is well known that certain forms of insanity can be cured by the action of coloured lights. The psychological effect owes its origin to certain ideas or sentiments associated with certain objects having particular colours. For instance, in Europe, the sunshine even by mid-day is never so bright as even that for a couple of hours in the morning on a winter day in our country, and, therefore, is very cheerful and enjoyable. The yellow colour suggests to them the mild sunshine in their country and, therefore, all the ideas such as those of cheerfulness and happiness are attributed to it. The dress worn on funeral occasions amongst Christians and some other communities is black, and thus "black" is regarded as mournful. Amongst us Indians, ideas of darkness, ignorance, sin, etc., are associated with it, and that is why it is detested; it does not convey any sentiment suggestive of or associated with mourning. Red is indicative of blood; hence, in Western countries ideas of cruelty, violence, murder, etc., are associated with it. Amongst us, particularly amongst the Hindus, red suggests both cruelty as well as auspiciousness, since it is the colour of both blood as well as *Kunkum*. Physiologically, too, red, especially when strong, strains the eye and, as it does not reflect light freely, darkens rooms. Green is abundant in nature, and we are very familiar with it; besides, it is a soothing and restful colour and, therefore, it appeals to most of us.

Thus it is these sentiments, attached to the colours by association with objects, which, in fact, make us feel happy or depressed. In spite of this powerful influence colour exercises on our minds, the majority of people are ignorant of the theory and effect of colours. The real artistic taste is found to be developed only in a few people. What commonly passes for artistic taste is, in the majority of cases, an imitation of what "persons of taste" have done.

This is particularly so in our country. Our senses of touch, smell, taste, and even that of sound are all live and sensitive. If we happen to touch something dirty, disagreeable, or impure (even from a religious point of view), our sentiments revolt; if there is something giving out a bad odour even far away, our acute sense of smell is awakened, and we hold a handkerchief to our nose; the sense of taste is developed perhaps even more. Few people would lightly value the preparations of a good chef or put off well-dressed dishes till Sunday. The sense of sound, too, or what is called an ear for music, seems to have developed in the majority of people, so far at least as to enable them to appreciate a harmonious melody. But the equally or perhaps more important sense of sight is surprisingly neglected. The beauty of form may appeal to most, but, by constant association with things that are crude and vulgar in colour from our very childhood, healthy development of this important sense has been totally neglected. It is, therefore, proposed to discuss here the elementary principles underlying colour.

Before doing so, it would be well to define a few technical terms so as to avoid possible confusion.

The Distinction Between Tint, Hue and Shade.—By mixing white with any colour, a *tint* of the same colour is produced. *Tone* means the same thing. As more and more white is mixed, the *value* of colour progressively increases.

By mixing a colour with another colour, a compound colour or *hue* is obtained.

By mixing tints of colours with black, *shades** are produced.

A colour is *broken* or *greyed* by mixing it with other colours either harmonious, or contrasting, or both, to make it lose some of its original character; i.e., it is subdued or made milder; a broken or greyed colour is still recognisable.

Harmony is that combination of colours in which each colour matches with the next adjoining it, and the combined effect of them is to present a neutralised bloom causing a soothing and pleasant reaction on the eye. In a harmonious combination, no single colour attracts the eye, but every colour merges its individuality to produce a common pleasing effect.

Discord is the opposite of harmony, in which each colour, instead of making a pleasing combination with the one adjoining it, produces a jarring

*Though the scientific meaning of *shades* is as above, it is frequently loosely used to mean a tint or a tone as in the expression, "Panels of walls should be in the same as, but of a slightly lighter shade than, that of borders."

effect with it. The result is to strain and fatigue the eye, and, if the discord is very sharp, even to cause a shock to the sense of sight by the violence of the discording colours.

Contrasting colours are those which, when placed side by side, make each of them look more effective. Contrast is not the opposite of harmony; contrasting colours when in juxtaposition produce a pleasing effect, but unlike in harmony, each asserts its individuality and provides a good setting for the other close to it. Contrasting colours are complementary to each other, and do not change when placed together. But when they are mixed together, they neutralise each other, and neither of them is recognisable. Black and white, red and green, blue and yellow, i.e., colours opposite to each other on the colour wheel (vide Fig. 26 facing page 88) are contrasting colours.

In order to explain the mutual relation between harmonious, contrasting, and discording colours, a simile from practical life will serve better.

Harmonious colours are like sincere friends and co-operaters, one forgets himself to help the other and the result of their combined goodness is to bring about peace, harmony, and prosperity to the community which they may be serving.

Discording colours are like sworn enemies who, if brought together, look angrily at each other and create an atmosphere of discord and violence about them.

Contrasting colours are like an ideal pair of a *Guru* and his devoted disciple, both persons of great distinction, each is complementary to the other and enhances the importance of the other.

What are called *primary* colours are only three, viz., *yellow, red,* and *blue.* All other colours—even those in the spectrum of the sun's rays—are produced by compounding these in different proportions; but these three colours are not themselves capable of being produced by composition of other colours, and that is why they are called *primary.*

Fig. 26 shows a colour wheel, which would serve as a key to the understanding of the relation between various colours in respect of their harmony, discord, and contrast. Only a few prominent colours have been included in the chart to simplify matters. Once initiated, the reader who is interested in studying complex problems can prepare an extended chart for himself.

The chart is based on the table prepared by Rood after a very large number of experiments and investigations. It was Rood who first discovered

that there subsists amongst colours a natural order which, if followed, produces harmony, and if reversed, creates discord.

A close observation of the chart will reveal that there is yellow at the top, which is the lightest colour and, therefore, nearest to white, and that at the bottom is violet, which is the darkest, and, therefore, nearest to black. It will be noticed that if you go from yellow to violet, either in a clockwise direction through orange and red, or in an anti-clockwise direction through green and blue, each succeeding colour is darker than the preceding one between the two extremities, viz., lightest yellow and darkest violet. White and black do not find a place in the chart as they can be produced by mixing other colours.

HARMONY

Rood showed that if the natural order of the colours and their relative depth or darkness be maintained in any colour scheme, harmony is created. Thus, if we take two colours, say orange and red first, and colour a surface with a certain tint of orange, the red colour coming close to it must be of a deeper shade than that of the orange for a harmonious effect. If a third colour, say purple, is introduced, it must be of a still deeper tint than that of the red, and so on. The same thing holds good of the left-hand series also.

It does not matter if one or more intermediate colours in the series be altogether missing in a colour scheme; so long as the natural order is maintained, harmony is bound to prevail. For instance, if yellow and purple are used, the purple must be of a deeper tint than the yellow.

To make it easier for understanding, a table is given below showing how harmony would be effected.

SERIES NO. 1

Colour	*Harmonises with a deeper tint of*	*Harmonises with a lighter tint of*
Yellow	Orange-yellow	
Orange-yellow	Orange	Yellow
Orange	Poppy red	Orange-yellow
Poppy red	Crimson	Orange
Crimson red	Purple	Poppy red
Purple	Violet	Crimson red
Violet		Purple

SERIES NO. 2

Colour	*Harmonises with a deeper tint of*	*Harmonises with a lighter tint of*
Yellow	Yellow-green	
Yellow-green	Green	Yellow
Green	Blue-green	Yellow-green
Blue-green	Green-blue	Green
Green-blue	Prussian blue	Blue-green
Prussian blue	Cobalt blue	Green-blue
Cobalt blue	Ultra-marine	Prussian blue
Ultra-marine	Violet	Cobalt blue
Violet		Ultra-marine

The harmony described above is of a simple type. Such simple types abound very much in Nature, a few of which are quoted below:

Fresh sprouts have light yellow-green leaves, which gradually change into green and ultimately into deep green or bluish green. Observe the brilliant and fresh colours on the leaves of *Coleus*, particularly of plants kept under a thick shade. Two or three simple harmonies of colours in both the series will be found on the leaves—a very striking example of harmony in colours on leaves. The leaves of *Caladium* show a similar harmony. If a mass effect is desired, look during spring-time from a distance at a row of trees lining the street; all the series from light yellow-green to green-blue in large masses of foliage will be noticed.

Again, in most flowers, when the colours red and yellow come together, the tint of the red will invariably be darker than that of the yellow. Almost all coloured flowers exhibit a partiality for harmony. Take the *Canna* for instance; it is a perennially blooming plant with a number of varieties; the flowers are all of different colours from white or cream to brilliant red, some have spots of bright red on deep yellow petals; however, all the varieties exhibit harmony to a wonderful degree, the colours of their flowers contrasting with green or blue-green leaves.

Most of the fruits obey the same law of harmony in colour. Take the orange for instance. When it is quite unripe it is green, as it grows to maturity the colour changes to lighter green, then to yellow-green, then to yellow, to orange, and finally, to orange-red in the ripe fruit. Apples do this in a still more striking manner. Lemons, cucumbers, pumpkins, chillies, brinjals, berries, all

do the same thing. The half-ripened tomato shows two harmonies, one in each series, viz., (1) green, yellow-green, and yellow, and (2) yellow, orange-red, and red.

The brilliantly coloured birds, such as the parrot, peacock and others, also show a general obedience to the laws of harmony, though there is often times a harmonious contrast.

Colour schemes for interior decoration based on harmony are the easiest and safest of all, though at the same time they are less interesting and lack thrill. The simplest scheme based on harmony is with spots, flowers or figures, forming a pattern in a colour of original or of less strength on a surface coloured in a paler tone of the same colour. A further advance is to mix two or three different harmonious schemes together on a background of the lightest colour of them. In more complex harmonious schemes, broken colours in different shades are used to harmonise with each other. The modern trend, however, is to disfavour a harmonious scheme even of a complex nature, as it lacks the element of adventure and surprise. A harmonious scheme, howsoever cleverly it may have been designed and worked, is dubbed as lifeless.

DISCORD

When the natural order of colours shown in the colour wheel is reversed, discord is created. This is possible in two ways, viz.,

(1) By using a lighter colour shade than the preceding, or,

(2) By using a deeper one than that of the succeeding colour in the chart.

Thus if a reference is made to the colour wheel facing page 88 we get the following table:

SERIES NO. 1

Original colour	*Discord with lighter tint of*	*Discord with deeper tint of*
Yellow	Orange-yellow	
Orange-yellow	Orange	Yellow
Orange	Poppy red	Orange-yellow
Poppy red	Crimson red	Orange
Crimson red	Purple	Poppy red
Purple	Violet	Crimson red
Violet		Purple

COLOUR CHART

EXPLAINING THE PRINCIPLES UNDERLYING HARMONY CONTRAST & DISCORD OF COLOURS.

There are two series; both start from the yellow, which is the nearest to white, and end in violet, which is the nearest to black. The first goes in a clockwise direction through orange, red, etc., while the other goes in anticlockwise direction through green, blue, etc. The colours as they stand in the above chart are in harmony. If the order is reversed, discord results. The colours opposite to each other are contrasting colours. The yellow and ultra-marine, orange and blue, purple and green, red and blue-green or green-blue, etc., are contrasting colours. The chart can be extended and any colour can be given its proper place in it.

Note:—The nomenclature of the tints and hues in the above chart shown in brackets, is according to Ridgway's standard.

CAUTION— **DO NOT EXPOSE THE CHART TO STRONG LIGHT FOR LONGER THAN NECESSARY.**

Fig. 26.

SERIES NO. 2

Original colour	*Discord with lighter tint of*	*Discord with deeper tint of*
Yellow	Yellow-green	
Yellow-green	Green	Yellow
Green	Blue-green	Yellow-green
Blue-green	Green-blue	Green
Green-blue	Prussian blue	Blue-green
Prussian blue	Cobalt blue	Green-blue
Cobalt blue	Ultra-marine	Prussian blue
Ultra-marine	Violet	Cobalt blue
Violet		Ultra-marine

Though discord is jarring, and it strains the eye and gives a violent shock to the sense of sight, it is often necessary. Otherwise, prolonged, consistent harmony would be tiresome. If life were only a bed of roses, nobody would appreciate the value of happiness. A pinch of salt or of hot spices is necessary when the palate is tired of sweet dishes, nay, there is a craving for it. Too smooth, too easy a life becomes dull and boring. There must be something of a thrill, some romance or surprise. But the latter should be just enough to recall the full value of the smooth, harmonious life. In a similar manner, a little discord, if judiciously administered, adds zest and stimulates the entire atmosphere of a room.

Too much discord is, at the same time, a dangerous thing to use. If it be even a little more than just necessary, it mars the whole effect. It should never be given a prominence such as on a wall surface or a screen, which must always serve as a background; it should be allowed in accessories, such as a vase, glazed pottery, cushion covers, flowers, bouquets, etc.

It is sometimes very difficult to avoid a discord. For instance, in a colour scheme with a violet or purple background, which are the last colours in the colour wheel in both the series, even though their tone be very pale, they would require even paler green or yellow for the sake of avoiding a discord. But if very pale colours are used, they would look quite flat and would have no "body" at all. Under such circumstances, just a line border of a little deeper tint of violet or purple, as the case may be, or an outline of white round the figures of yellow or yellow-green in the pattern would considerably save the situation.

CONTRAST

In the colour wheel, any colour in one series is complementary to the colour exactly opposite to it in the other series. The complementary colours are called contrasting colours. Thus purple and green, yellow and ultra-marine, etc. are contrasting colours. It is often loosely said that red and green, or blue and yellow are contrasting colours, but it is not strictly true. This can be verified very easily. Look steadily for a minute at a strong red colour and then turn your eye to a fresh green surface, you will invariably see a blue patch before your eyes. Instead of looking at green, if you had looked at blue, a green patch would have appeared, indicating that the complementary colour of red is a combination of green and blue, and neither of them singly. The reason why the green or blue patch appears before the eye is that after looking steadily at a strong colour the eye gets tired and tends to see the opposite of that colour.

Contrasting colours when placed side by side, not only do not change or re-act upon each other, but each heightens the effect of the other. Thus, when black and white come together, the black causes the white to look whiter by contrast and *vice versa*. That is why contrasting colours are said to be complementary to each other. Here is a list of a few important contrasting colours, which can easily be verified with the help of the colour wheel.

Colour	*Contrasting Colour*
Yellow	Ultra-marine
Orange-yellow	Cobalt blue
Orange	Prussian blue
Poppy red	Green-blue
Crimson red	Blue-green
Purple	Fresh-green
Violet	Yellow-green

Contrasting colours look most beautiful when they are of equal strength and when one of them is in small areas and the other in a large surface surrounding the small areas.

Contrast in colours abounds in Nature, but not in very large surfaces. Red flowers amidst green foliage is a very favourite contrasting scheme with Nature. The brilliantly coloured birds have contrasting strong colours on their wings. As contrasting colours attract the attention, they have been advantageously used on most of the national flags, and also on starboards of ships and railway and road signals. The sky is full of contrasting colours at sunset.

In decorative schemes, contrasts are not so dangerous for use as discords, because they are not jarring. What they do at the most is to attract the interest of the looker-on toward themselves and thus throw the entire colour scheme, even though rich and elaborate, into insignificance. Therefore, contrast must be used just like discords in small quantities and in unobtrusive positions just to serve as an emphasis or as an accentuating note. The piping of the edge of a cushion, edges of a lamp-shade, a chair-cover, door or cupboard handles of bakelite, etc. in strong contrasting colours, are some of the suggestions.

COLOUR SCHEMES

With the foregoing discussion of the theory and principles underlying colour schemes, the reader will, it is hoped, be in a position to understand at least what would cause harmony and what would bring about discord. It is not possible to lay down definite hard and fast rules as to what colour and its combinations would look best, because it is wholly a matter of individual taste. One person may be fond of a particular colour which another person might abhor. All colours are beautiful; there is not a single one, the colour scheme built on which cannot be pleasing.

Equipped with the knowledge already acquired with the help of the colour circle, the reader should no longer accept a scheme thrust upon him by his contractors, or copy what his friend has adopted for his own house, even though the latter be a person of artistic taste. To help him a little further, a few facts universally accepted are given below.

It must never be kept out of sight that light is the basis of every colour scheme. Without light, colour has no existence. Therefore, the colour scheme of a room primarily depends upon the manner in which it receives light. This assumes a special importance in a tropical country like India. In England and many other Western countries, the sky is always full of clouds, often for twenty-four hours, and there is very little sunshine, if any at all. Therefore, in spite of the provision of large windows in every exposed wall, the light inside the house is grey and never white, and, therefore, colours of only less than half their original brilliance look at their best. This warns against copying even those colour schemes which have been announced to be the best in those countries. Here, in our own country, even the strongest colour is neutralised and considerably toned down in the dazzling light. Moreover, the direct sun-light adds a tint of yellow or white to all the colours and, therefore, makes them look paler. Even the colour black loses much of its sombreness and depressing

effect in the bright sunlight. We are often classed by the Westerners in the same category as the African negroes and shown up as being fond of garish, brilliant colours, so much so that the expressions "Orient blue," "Indian red" are applied to blues and reds of original strength. Similarly, the term "riot of Oriental colour" is often applied to a scheme in their country in which strong contrasting colours are used. But there is nothing wrong or unnatural in it. Even Nature has adopted it. Not only coloured birds like the parrot and the peacock in the Orient have brighter colours, but even the flowers in the tropics show a partiality for more brilliant colours than those in the cold countries. If we were to use the colour strengths which are used in the Western countries, whether in textiles or interior decoration, they would all be neutralised by the dazzling sunlight. Besides, strong sunlight has a tendency to fade or bleach colours.

The light coming through windows in the eastern side of the house is bright and very cheerful as the morning sun is very pleasant. Further, as the sun rises, the morning light gets warmer and brighter. Whereas the light through the windows in the western walls is hot, causes restlessness, and gets fainter and fainter as the sun sinks down below the horizon. It is, therefore, necessary to treat the two rooms, in respect of colour, in two different ways.

In a similar manner the north light is always cold,* but uniform in strength, while the south light is moderately warm and varying in brightness according to the season. It is, therefore, necessary to avoid very cold colours such as blue, grey-blue, green-blue, etc., in the rooms facing the north and adopt such colours as yellow-green, light rose, cream, buff, etc., instead. The colours in a hot room should be cold and soothing, and those in a warm room moderately so, though this further depends upon the purpose for which the room is used.

After this, the proportion of the window space to the room size (both floor area and height of walls) must be considered. Suppose the window is very large in proportion to the size of the room. The result would be that the glare of the dazzling light would soften the colours and make them look flat, if they be light, both by the direct action of the dazzling light and also by the reflection of light from one wall to the other. Therefore, a colour comparatively bright but restful and dull in reaction would be appropriate in large forms or designs. Thin lines or small forms in delicate colour would not be seen at all.

*Here again, the circular colour chart facing page 88 is helpful. As a general rule the yellow-green-blue series of colours on the chart and the combinations of other colours with the light colours in that series, such as lime green, blue grey, French grey, etc., are *cold* colours, while the colours in the red-purple series and their combinations are *warm* colours.

In dark situations, on the other hand, for instance, in a large room with small windows situated far apart, the colour to be used must be such as would be reflected from the lighted portion of the surface to the dark spaces and corners, and remove the gloom therefrom. In such rooms, the treatment also of the ceiling should be of colours which reflect light so that the capacity of lighting on the part of the windows would be increased.

This is exactly what is done very effectively in the Mugal palaces at Delhi, Agra, and Bijapur. To avoid the strong glare which tires the eye, they constructed inner apartments with thick walls for coolness, and provided them with small windows. This had, naturally, a tendency to make the apartments look gloomy and dull, which they successfully remedied by using very bright colours on the walls and even brighter colours and gilding on the ceiling, which reflected their colours into the dark corners and imparted an air of cheerfulness to the entire apartment.

If the walls are disproportionately too high, they can be made to look low by providing a dado at the bottom and a frieze at the top. The dado is usually from one foot to three feet in height, and should never be higher than the height of the back of the chairs. Its colour should match that of the doors and woodwork. The frieze should be of the same colour as either the wall or the ceiling, but of a lighter tone, and should harmonise with the adjoining colour. Another way to reduce the apparent height of the walls is to darken the ceiling and give it a coat of copal varnish so as to make the surface glossy. The partial reflection of the floor into the ceiling gives an effect of its having come down.

For increasing the apparent height of the ceiling, on the other hand, one way is to paint the ceiling lighter than the walls. Like the sky out-doors, a light coloured ceiling leads the eyes upward, and gives a feeling of height and freedom. Another way is to give a perpendicular effect by drawing vertical stripes on the wall so as to divide it into tall and narrow panels. The stripes may be of the same colour as the panels, but of a little deeper shade. They might offer an opportunity for showing an effect of contrast in a stimulating colour in the form of thin edging lines on the borders of the stripes.

An effect of increase in the length and breadth of a room can be obtained by painting or distempering the walls and the ceiling in the same colour tone. The same effect can be further increased if the colour of the floor, or at least that of the carpet, matches closely that of the walls. The continuity between the walls and the ceiling, or the walls and the floor, conceals their extremities and gives an effect of something like endlessness.

The foregoing discussion explains the theory underlying colour schemes in interior decoration. But when an amateur has to face a practical problem, he is sure to be confused as to how and where to start. The advice is that if he is writing on a clean slate, i.e., if his house is newly built and is to be newly coloured and decorated, if also all the furniture, curtains, carpets and other accessories are to be newly purchased, then it is a comparatively easy task. He will, in all probability, have a fancy for some particular colour, no matter even if it be red. Let him build his colour scheme on the basis of that colour. He will first think of the windows, and the light coming through them. (This is very important because the windows are once for all fixed into walls and, therefore, though the light can be lessened, it can never be increased.) Then he will think of the curtains which will match his favourite colour. It is better because it is easier to buy the curtains first and then to colour the walls to match the curtains, rather than to colour the walls first with a certain colour, and then to hunt for curtains of a pattern and colour to match. As a matter of fact, such curtains may not be available at all in the market. When the curtains are purchased, they should be temporarily hung in the windows and the light reflected by them onto the walls watched. A patch of the desired colour may be applied on the wall or a paper coloured with the tint held against the wall where the light from the curtains is reflected, to watch the effect. In this way, the shade which gives the best effect may be determined by trial. After this, the colour of the dado, ceiling, and carpets should be decided upon. The dado should always be slightly darker and the carpet still a shade darker as they are more liable to be soiled and then look dirty if coloured in very light shades. The ceiling should be of a lighter shade, especially if the room is not adequately lighted, so that it would reflect light. After this is done, the colour and shade of the upholstery, chair-covers, cushion-covers, lamp-shades, rugs, ash-trays, book-cases, etc., are to be determined. Upholstery and chairs are not of great importance, because, if they are not of the desired colour and shade, the defect can be remedied by providing covers of the required colour and shade. In this way, the entire scheme should be completed.

If, however, a colour scheme is to be prepared to suit a house, which is already in existence, or to which some additions, alterations, or in which renovations are to be made, it is rather a difficult job. In this case, some nucleus may be chosen round which a scheme may be built. For instance, there may be some valuable woollen rugs, or some costly piece of furniture already in possession which cannot be disposed of. These or similar articles might provide a basis for suggesting a suitable colour scheme. Unless a room is detached from the main house, or forms an altogether separate unit isolated

from the other rooms by something like a staircase, or a lobby, the scheme for the entire house should form one unit, individual rooms—one opening into the other—forming parts of that unit. Of course slight modifications will be required to suit the aspect of each room, and are essential from the point of view of avoiding a monotonous effect.

The science of interior decoration is very interesting and provides full scope for any amount of thrill and excitement for one who wants it. As the modern interior architecture has dispensed with all mouldings and ornamentation, the importance of decoration by colours has increased several times. The amateur, however, is advised not to dabble in contrasting schemes until he has tried several schemes based on harmony, and acquired sufficient confidence in them.

As a general rule, bed-rooms and living-rooms should have restful and soothing colour, such as green, blue-green, blue-grey, etc., unless they are in the north. In the latter case, a cream, pale primrose-yellow, lime-green would be more suitable. The dining-room should have a lively colour such as pale pink, rose, yellow, orange, etc., with a certain stimulating note. The kitchen should also have lively colours, but, for practical reasons, such colours as would not be soon spoiled by smoke, such as buff, blue-grey and smoke-grey, etc., should be used. The bath-room should have fresh, clear, and stimulating colours such as ivory, cream, etc., with notes of stimulating contrasting colours. If white glazed tiles are used for the dado in the bath-room, a coloured border should be provided, or the upper surface of walls and ceiling may be coloured in a shade of a warm colour like rose so that it would be reflected by the tiles, and the room would be made to look cheerful.

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FURNITURE AND FURNISHING

HOME furnishing forms a part of the interior decoration and must be considered in relation to all the aspects of the latter, viz., size and shape of rooms; positions of doors and windows; sources, direction and intensity of light; colours of walls, floors and ceiling; colour and texture of curtains and draperies, etc.

However, by far too large a number of people crowd their rooms with furniture collected at random without any regard to its fitness, comfort, or even form. Some buy it just to impress their friends. When these people think of furnishing their homes, they rush to a furniture shop, pay a high price and strike a bargain of their entire requirements in a few hours. It is no wonder if they have to repent for their choice afterwards because they did not consider the matter from the point of view of their specific requirements. As a matter of propriety, every piece must be planned to fit the walls and spaces and the sizes of the rooms it is to occupy. The pieces of furniture should be few, but well chosen as regards their beauty, strength, and utility.

Unlike other forms of decoration, such as the colours on walls and ceilings, curtains and draperies, pictures on walls, etc., which appeal to us only through the sense of sight, furniture does so both through the eyes and touch—we live with furniture, we handle the individual pieces, we sit on chairs and sofas, lie in beds, and write on or eat from tables. Hence, furnishings must be considered not only from the point of view of beauty, but also from utility or function. Beauty in furnishings comes through graceful lines, good proportion, lovely wood-grain or pleasing colours, and the functional needs or utility includes usefulness, appropriateness or fitness of purpose and durability. In modern times, functional needs also include ease, labour-saving, and economy in maintenance. For instance, brass fittings for doors and windows must be polished every now and then. If fittings of rustless steel, or chromium-plated or even oxidised brass or steel are substituted, the latter do not require any care for an indefinite period; glass-topped tables and teapoys require very little cleaning effort, and so on.

The design of furniture should be dictated by common sense and good taste. The object of furnishing a home is to give comfort to the body, pleasure to the mind, and to conduce to the preservation of health. A chair, for instance, to be comfortable should have a sufficiently spacious seat and should amply support the back; to satisfy the requirements of good taste and to

please the mind, it should have a graceful form, and the colour of the body and of the cushion should be in keeping with the general scheme of decoration of the room. In order to be conducive to sanitation, it should be free from any carving which does not add to the comfort, but only increases the cost and further acts as a depository for dust and dirt. Its legs should be strong and plain and not twisted or curled. Its seat should not be covered with velvet (which catches dust and is difficult to clean) but with leather—real or artificial—or some such material, having a pleasing colour and a plain surface. This functional test can be applied to every piece of furniture.

For the requirements of health, every piece should be light so as to be easily removable; or if bulky, it should have means to permit the floor below being cleaned and washed. It should, for this purpose, be preferably supported on castors which would allow it to be moved aside so that not only the floor below, but also the wall behind, may be cleaned. It should have not only no carving but not even small recesses on which dust is likely to collect. Further, in respect of furniture, as in everything else, shams and pretensions should be avoided. They are bad in taste, bad in art, and bad in moral sense. Few persons would believe that a concrete staircase painted like marble is of real marble.

With all the improvements that are being made every day in various trades relating to furnishing material, and by exercising common sense and good taste and with a careful regard for use and suitability and avoidance of all that is sham and false, we may make our homes not only comfortable and healthy, but artistic and beautiful as well. The general effect of furnishings should be that plenty of free unobstructed space should be left for easy movement. In planning rooms, therefore, include only the essential and when the background and lighting are decided upon—at least temporarily—consider the individual pieces which will fit well into the spaces.

Here is a list of common furniture used in different rooms.

ENTRANCE VERANDAH.—A closed closet with coat hangers, hooks, shelves for hats and shoes, sandals, etc., racks for umbrellas and canes, and pegs for wraps and rubbers, with a mirror in front. A thick coir mat to catch dirt from shoes before it is carried to other rooms. A few pictures of general interest, such as landscape views hung on walls. If the verandah is used as a waiting- or sitting-room, provide also a few reed or wicker couches with cushions, chairs, a desk for newspapers and one or two tea-poys, etc.

RECEPTION ROOM.—This is the show-room of the family and should be decorated formally. Rich formal furnishing, heavy draperies, paintings, deep pile rugs, etc. are suitable.

LIVING-ROOM.—This is the common meeting room of the family. Book-shelves, desk, side-board, cupboards, radio, chairs, settees, etc.—all informal furniture, neatly but informally arranged with emphasis on comfort, friendliness, and sociability.

BED-ROOM.—Bed, dresser, bedside desk, one or two chairs, chaise lounge, etc., and if there is no separate dressing-room, provide also clothes closet, complete with rods, hooks, hangers, shelves, etc., dressing-table, mirror, wash-hand basin. Colour and decoration should be restful and soothing.

DRESSING-ROOM.—Clothes closet, dressing-table with mirror, lavatory basin and good light.

DINING-ROOM.—Plain walls with fruit or floral designs or landscape pictures and cheerful colours. Dining-table, chairs, china cupboards, side-board, serving-table, etc., all pieces including the floor, capable of being easily cleaned with water.

KITCHEN.—The furniture and equipment have been already described in detail under "Grouping."

LIBRARY.—Plenty of wall space for book-shelves. The latter may preferably be inside walls. 65 per cent of shelves should be 9″ high and 6″ deep, 25 per cent 10 inches high and 8″ deep and 10 per cent 12″ high and 9″ deep. Comfortable chairs, desks, and good lamps placed at the side or to the back of the reader. Good day-light without glare, breeze, coolness and comfort—all conducive to concentration of mind.

The choice of pictures in rooms is a personal matter. However, it is better to hang only a few on the walls at a time, storing the surplus and changing them occasionally. The same remark applies to ornaments such as vases, statues, etc.

If the radio bought in the market be not of a colour and design to match with the scheme of decoration, a cabinet of the proper design should be made and the radio enclosed in it.

If the windows be not of the desired shape, curtains and pelmets may be used to frame it so as to alter their shape.

PLANTS IN ROOMS

In Western countries, a decorative effect is obtained by cultivating plants in flower-pots and arranging bouquets of flowers on tables inside the rooms. This is a very good thing, and should, by all means, be universally adopted in our country. Not only do they give an appearance of freshness and liveliness to the room, but also help to purify the air during the day-time. Their action on air is, on the whole, the reverse of that of animals.

It is true that plants respire like animals, breathing in oxygen and giving out carbonic acid gas. But this process of respiration is very slow and is hardly perceptible during the night. On the other hand, the respiration during the day-time is very insignificant with the reverse process of assimilation, in which the green matter in the leaves actually decomposes the useless carbonic acid gas under the influence of light, and gives out a large amount of oxygen for the benefit of animals. On the whole, the presence of green plants inside the house is very beneficial. The air inside the house is charged with a certain amount of smoke, which contains some elements such as sulphur compounds, particularly in the house where gas is used for cooking and lighting purposes. These are detrimental to the plant life. There are only a few plants such as a few varieties of cactus, certain plants, and a few ferns which possess the power to resist these evil effects.

Apart from the physiological effect, as explained above, of plants inside the house in respect of purifying the air, the psychological and moral effect on our minds is certainly invaluable. Every glance of ours at the fresh foliage of plants or at the pleasant delicacy and cheerful colours of flowers, is accompanied by an involuntary pleasurable emotion which stimulates even the depressed mind. It is a common experience that a child even before the age of reason, stops crying at the sight of a beautiful flower and instinctively spreads out its hand to catch it. Our environment has so much to do with the shaping of our lives and disposition. Then why should we not make them cheerful if it can be done without much labour and expense?

Thus it is possible to make a small conservatory or a fernery on a side of the verandah, or on the open terrace on the rear side where children play. It is possible to make hollow concrete boxes in the extension of window-sills on the outside and to grow flowers in them. It is also possible to make boxes of concrete for plants in the top-layer of the parapet walls of terraced roofs for roses and other flowers. A garden of small beds of flowers in earth spread and shrubs grown in boxes could be successfully made on top of terraced roofs, which would be most enjoyable for poor families who cannot afford the luxury of a garden in the cottage compound.

12

INSULATION OR HEAT-PROOFING

The function of insulation is to retard the passage of heat through walls, floor, and roof of the house. When the outside air is colder as in the winter, heat tends to flow outside, and when it is hotter as in the summer, it flows into the house.

In Europe, the summer is very mild and, therefore, they do not necessarily require insulation for summer conditions, but in winter, if the house is not properly insulated, a large amount of heat within the house escapes and increases the bill for coal, gas, or electricity used for heating air. In most parts of America, the summer is as severe as here in India, and the winter, too, is as severe as in Europe and, therefore, they have to be very particular in providing proper means of insulation, which, even though initially very costly, pays them in the long run as it helps them in both the summer and winter. The item of insulating the house is as necessary and important in their construction estimate as the foundations, walls, and the roof.

Our problem in India is a very simple one. Except on some hill-stations, we do not require fires in the winter. We want insulation for summer conditions only. The method employed hitherto such as providing a wooden ceiling in the roof and *khus* curtains in windows has been quite unsatisfactory. But, with the advent of air-conditioning, which is sure to be commonly adopted in the not too distant future, systematic efforts at insulating the house would be necessary; otherwise, the recurring cost of air-conditioning would be very heavy. Hence, it is proposed to deal here with the latest methods of insulation a little in detail.

It should be noted that even though insulation may be necessary for summer conditions only, it is bound to help during winter also in keeping the house warm and enjoyable.

We have seen in an earlier chapter while discussing orientation of houses (pages 20-22) that the main cause of discomfort in summer is the fact that the roof and outer walls of the house absorb heat from the sun's rays and radiate it inside. Therefore, if a layer of some perfectly non-conducting or insulating material is interposed between the outer and inner faces of walls and just below the roof so that the heat absorbed by the outside surface is either stopped or reflected away before it reaches the inner surface, our purpose would be eminently served. Air itself is a very bad conductor and, therefore,

if a cavity is formed inside the thickness of the wall and the roof, it should, in theory, prove a very good insulator.

But there are practical difficulties, more particularly under the roof, of properly sealing the cavity so as to make it perfectly air-tight. If this is not accomplished, i.e., if the cavity is in communication with the outside and inside air, the air in it absorbs heat or cold and no longer serves as an ideal insulating medium.

The modern methods of insulation may be classified into four main types:

(1) Blanket type.

(2) Loose-fill type.

(3) Board type.

(4) Mirror type.

It may be mentioned here that all these types are suitable for the method of construction of walls which is rarely practised in India. However, we can very easily adopt them for insulating our roofs. In fact, a roof, particularly a tiled one, radiates more heat than walls of the ordinary thickness built in our country.

The method of constructing walls practised in the Western countries is this: The entire weight of the floor or floors and the roof is supported by a framework of vertical "studs" or posts, erected two to four feet apart, either of timber or steel, and on both sides of these studs is fixed lath-work, either of metal or wood, which is plastered with cement. In other words, even the outside walls are only three to six inches thick with an inside cavity equal to the thickness of the studs. Sometimes these hollow walls are constructed with the outside covering of either wooden boards (shingles) nailed to the studs or a four inch brick-in-cement wall (brick-veneer), and the inside covering of lath plastered with cement as usual. In any case, the outside walls are thin, requiring very light and inexpensive foundations. The entire reliance for heat-proofing is, therefore, placed on the insulating material used inside the cavity. Our practice in this country is to build solid walls and depend upon their thickness for heat-proofing.

MODERN METHODS OF INSULATING A HOUSE

(1) In the Blanket type, there is a regular blanket, or rather a quilt, made of any loose, fibrous material like sea-weed, loose coir, mineral wool,

wood-fibre, etc., spread between two layers of tough (building) paper and stitched just like cotton quilts, and formed into rolls usually in two widths sixteen inches and four feet. These rolls are unfolded and tacked to the framework of the studs by means of thin wire nails. In roofing, the wider rolls are nailed direct to the rafters after stretching them properly and the ceiling boards are fixed above on which tiles may be laid as usual on battens. The quilt is usually one to two inches thick.

(2) In the Loose-fill or bulk type, loose insulating material, fibrous, granular, or powdery, is either poured, blown, packed or filled under compressed air as necessary into the cavities inside the walls or under the roof. As the thickness of the cavity is considerable (two to four inches), this type proves a very effective insulator.

The material can be filled into the cavities of the outer walls through holes at the top, or may be packed by hand as the wall progresses, but in roofing it must be packed on the top of the ceiling boards before the tiles are laid.

In moist and damp localities, it is likely that the moisture or water vapour may condense and not only reduce the insulation value of the material, but also set a rot in the loose material itself and also in the wooden framework of the wall, besides causing foul gases to emanate. It is, therefore, necessary in such localities to provide proper means of ventilation inside the wall so that if air circulates, the water vapour also moves out with it or dries up.

In the above two types, the mineral fibres such as rock-wool, glass-wool, etc., have one special advantage over the vegetable fibre such as sea-weed, wood fibre, etc., viz. that the mineral material is fire-proof, vermin-proof, and also rot-proof.

(3) In the third type comes the material consisting of insulating boards, either rigid or flexible, from one half to two inches thick. They are made of wood-fibre, suitably treated, and compressed between rollers so as to form large sheets which can be used in several different ways. The rigid board, on account of its stiffness, can be used as a structural material, for instance in the place of lath-work or as ceiling boards under the roof. The insulating board, whether rigid or flexible like thin cork sheets, can also be used as a plaster base, applied to masonry walls by cementing or nailed to a wooden frame. The variety of insulating boards which has a smooth finish can be used also as an interior finish to walls. Thus, besides insulating, the board type of insulating material serves another purpose also.

(4) The principle involved in the Mirror type is quite different from that of the above three types. It is based on a law of physics, viz., that if a ray of heat impinges against a polished surface, it is reflected back toward the source of heat, it not only effectually cuts off the heat but causes it to be reflected away. It is not necessary that the surface should be bright. A single curtain of reflecting paper is sufficient, though usually two or more curtains are used to increase the insulating effect. The action of the paper curtains is two-fold. The first is mechanical in so far as the metal-clad paper is very tough and, if tacked well to the frame-work, effectually seals the cavity and traps air inside, which itself forms a very good insulator. The second is optical, and the paper curtains reflect away the rays of heat.

If it is desired to insulate a house with the present methods of constructing solid walls, it is necessary to do the following:

(1) Insulate the roof by adopting one of the methods mentioned above.

(2) Keep the doors and windows in the outside wall closed during hot hours, and provide them with either

(a) Properly weather-stripped wooden shutters, or

(b) Panes of a special kind of glass such as "Calorex," which are often used for windows of the first and second class railway carriages. They admit light but cut off most of the heat, or

(c) Double panes of ordinary glass which, with the film of air between the two panes, materially cut off the heat rays.

(3) Build walls of such material as absorbs heat least and radiates it most readily.

Amongst building materials, metals are the best conductors of heat and, therefore, absorb heat and also radiate it most readily. Brick absorbs more heat than stone but also radiates it more easily. Stone is a bad conductor of heat, but once it absorbs it by long exposure, it is very slow and reluctant to part with it. Earth or clay is a still worse conductor. Therefore, walls of unburnt clay or of *pise de terre* make the house cool and comfortable. That is also why mud roofs are cooler than concrete terraced roofs which, again, are cooler than tiled ones.

The colour of the surface exposed to the sun's radiant heat has a great effect on comfort. White absorbs the least heat, and whatever little is absorbed

it radiates again most readily. Its opposite extreme is black, which absorbs heat most and is very slow in radiating it. Intermediate between these are yellow, grey, green, blue, and red, in the order of absorption, i.e., yellow absorbs heat less and radiates it sooner than green, and so on. White-washing the exposed surface of walls and roof is an effectual remedy, but it causes a glare. Grey or khaki (hay colour) is, therefore, the next best so far as insulation is concerned.

Even a galvanised-iron sheet roof can be considerably improved in respect of heat by spreading grass, either loose or in the form of a mat, on its top. Even a thin bamboo matting on its top affords considerable protection. It does it in two ways: firstly, it possesses considerable insulating property, and secondly, reflects away the heat rays from its yellowish, shining surface as the metal-clad paper does.

13

AIR-CONDITIONING

In its present highly specialised form, air-conditioning has developed very recently, and during the past few years in particular, it has made such great strides and such new discoveries, while improvements are being made every day, that it promises to be very cheap and come within fairly easy reach of the middle-class people in the immediate future.

"Air-conditioning" a room, in plain, simple words, means artificially creating such conditions of the air inside the room as would give maximum comfort. Now, what are the factors which make us feel comfortable? We know that circulation or movement of air is one. It is our every-day experience that on a hot or sultry day, when we sit near a fan, we feel comfortable. But if we analyse the causes of this comfort, we shall find that it is not the movement of the air alone, created by the fan, but something more which is responsible for the comfort. The hot and sultry air caused us to perspire to a more or less extent, and it is the evaporation of this perspiration by the movement of the air that cools down the temperature of the air in the immediate vicinity of our body-surface and gives us the feeling of comfort. Thus we know that (a) the movement of air and (b) the lowering of temperature are necessary for comfort. There is also a third factor, viz., the moisture or water vapour present in the air which affects our comfort. Everybody knows that in a coastal place like Bombay or Madras, though the temperature be not high, it is the amount of water vapour with which the atmosphere, due to its proximity to the sea, is charged that makes us feel oppressive, particularly when the air is still. Thus water vapour in the atmosphere, or what is called "humidity," is a third factor—and perhaps more important than the other two —affecting our comfort.

Now according to a law of physics, the maximum amount of water vapour which the atmosphere can hold, depends upon the temperature. It increases with the rise and decreases with the fall in temperature. Thus, supposing that the atmosphere is saturated with water vapour at a certain temperature and that by some cause the temperature is suddenly lowered, then the water vapour in excess of the capacity at the lower temperature is condensed and separated and falls to the ground. This is exactly how we get "dew" and even "rain."

Scientists have found by experiments that the requirements for the optimum comfort of the human body for Indian conditions are: a range of

temperature between 76° and 82°F. and the relative humidity between 60 per cent and 45 per cent respectively. This means that the greatest comfort is caused when the temperature is, say 82°F., and at the same time the amount of water vapour present in the atmosphere is 45 per cent or about 5 per cent less than half of the maximum which it could hold at 82°F.

Thus for getting maximum comfort we must secure the following:

(1) To maintain the temperature between 76° and 82°F.

(2) To maintain the relative humidity at 60 per cent to 45 per cent.

(3) To cause the air to circulate.

But, if the same air in the room was circulated round and round again, the oxygen in it would soon be used up by human respiration. Therefore, in the course of the circulation, some vitiated air must be expelled and fresh air brought in to replace it continually.

Further, the movement of the air inside the room must be at such a speed that no perceptible draught would be felt.

Perfect air-conditioning not only seeks to do all this with automatic controls, but even a little more, viz., it filters or deprives the air, before it is admitted into the rooms, of all particles of dirt and dust which, while floating in the air, carry a large number of harmful bacteria.

By the way, the filtering of air so as to eliminate dust and other matter is very beneficial to asthmatic patients.

In the process of making this accomplishment, we automatically secure one more advantage, viz., the insulation of sounds. It is this wise: For proper air-conditioning, all the doors and windows have to be kept closed—the windows exposed to the outside air with double-glass panes, if necessary—and this effectively shuts out all the outside noises.

If all-the-year-round air-conditioning is sought to be accomplished,

(a) *In winter,* the air is much cooler than the comfort zone of temperature, viz., 76° to 82°F., and, therefore it contains much less moisture, also, than the relative humidity at the comfort zone; hence we have to,

(1) Heat the air;

(2) Humidify it or add moisture to it;

(3) Filter and force it into the room for proper circulation.

(b) *In summer,* we have to,

(1) Cool the air;

(2) Dehumidify it or extract moisture from it, and

(3) Filter and force it into the room for proper circulation.

The third factor is common to both the cases.

The cycle of operations involved is shown diagrammatically in Fig. 27.

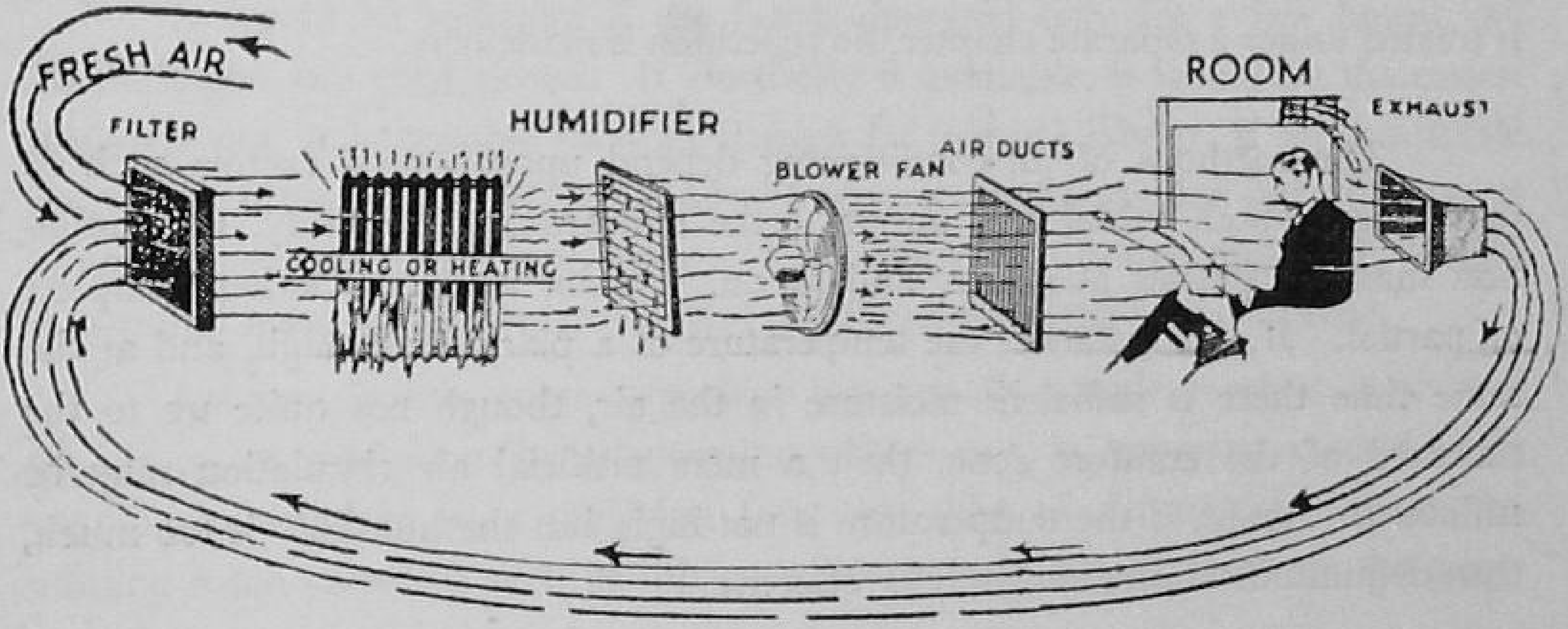

Fig. 27

With these general facts as a background, we shall now discuss the different methods of accomplishing this.

India being a tropical country, our problem is mostly one of summer air-conditioning only. So this would be discussed in greater detail here.

Before proceeding to describe the methods of summer air-conditioning, it would be well to sound a note of warning: When the outside temperature is high, the atmosphere of an air-conditioned room should never be so cool as to cause even a slight chilling effect to one entering the air-conditioned room from outside. Normally, the difference between the outside and inside temperatures should not exceed 15°F. in the case of rooms likely to be occupied for a short period of two or three hours (such as restaurants, theatres, etc.), and 20°F. if the room is to be occupied for a long period, as in a residence or in an office. This is necessary in the interest of health.

One is apt to think that this is a serious hindrance in the way of air-conditioning at places where the temperature in summer is high. For instance, there are a number of places in India where the temperature in the summer is

as high as 115°F. in the shade, and if it be positively harmful to lower it below 100°F. inside, there is no use of air-conditioning at all, as this is 18° higher than the highest limit of the comfort zone (viz., 76° to 82°F.), but it is not so. It is the common experience that to those accustomed to a temperature of 115°F., 100°F. gives as much comfort as 82°F. temperature gives to people living in temperate climates. Again, the heat at such places on the plains is too dry and parching and, therefore, if by air-conditioning we introduce the correct relative humidity and further keep the air in motion, we will feel as comfortable and still healthier without a low temperature inside.

For efficient and economical air-conditioning, it is necessary to insulate the whole house or, at least, the rooms to be air-conditioned. As this subject is treated under a separate chapter, no repetition is made here.

The methods of air-conditioning depend upon several factors such as the budget (both initial and annual), the temperature, humidity, the insulation made, materials available, and so on. Again, it can be either complete or partial. If, for instance, the temperature of a place is not high, and at the same time there is sufficient moisture in the air, though not quite up to the standard of the comfort zone, then a mere artificial air circulation may be sufficient. Again, if the temperature is not high, but the humidity is too much, then dehumidification alone may be effective.

The cheapest and a fairly efficient way of partial air-conditioning is by the method of what is called "cooling by night air." This method lends itself particularly suitable to the plains or, in fact, to all the places in India, except those in the coastal region where the atmosphere contains too much moisture.

The method consists in mounting a fan of suitable size just in the loft below the roof, and working it by night. A square or circular staircase built centrally in a house extending in a tower or a dome at top with windows on opposite sides for cross ventilation, would provide an ideal place for such a fan, and the results, too, would be very satisfactory. The way in which it works is this:

Soon after nightfall, the outside air becomes cool, but the roof, walls, and every solid thing, both inside and immediately outside the house, which have absorbed heat during the course of the whole day, begin to radiate it and make the rooms a veritable hot-house by night. This they continue to do almost till the small hours of the morning, making it impossible for the inmates to enjoy a restful sleep. Now, if the windows of the ground-floor be

opened just as soon as the outside air begins to cool down, and if the fan is set working, it would draw up the outside air through the entire house and cool the latter down appreciably in a short time and contribute to the comfort of the inmates. As the night advances and gets cooler and cooler, the air from outside, being sucked in by the fan, would materially reduce the temperature of the surface of the inner wall and floor and everything inside the house. If, upon rising in the morning, all the windows and outside doors are again closed and kept closed, as far as possible, during the whole day, it would be a long time before they absorb heat again. In this way, throughout the day also, the inside air of the house would remain cool and comfortable, and thus our object would be attained.

It would be sufficient if the fan is operated only for a few hours, say till midnight and then closed. If electricity is available, it would be the easiest thing; if not, it is possible to work it even by manual labour, if some suitable gearing is introduced. We normally employ a *punkha*-puller just to cause a movement of air in a single room. Here the entire house could be cooled in a much more efficient manner, and possibly within the same expense.

Another slightly more expensive but equally simple method is to cool the air in a closed room by evaporating water—say, by exposing a continually wetted cloth-surface to a revolving fan, and then to dehumidify the air by utilising some chemical such as lithium chloride, etc., which possesses the property of absorbing moisture.

As to the methods of systematic air-conditioning under proper controls, they are many. They can, however, be classified into two divisions:

(1) *The central system.*

(2) *The unit system.*

The principles involved in either are the same, viz.,

(a) Sucking the air through filtering media,

(b) Cooling (or heating) it,

(c) Dehumidifying, if it is to be cooled (or humidifying, if it is to be heated),

(d) Forcing it into the rooms for proper circulation through grilles, and finally,

(e) Collecting the used air through an exhaust to be mixed with some outside fresh air also and sucked again through the filtering medium, thus completing the cycle.

The only difference between the two systems is that whereas in the central system, (i) the different operations are performed at different places, and

only the conditioned air is supplied to rooms through regularly constructed concealed ducts mostly at the ceiling level, in the unit system; (ii) special, portable, attractive cabinets of a design to fit in with the decoration of a modern room, are placed inside the room. They are self-contained in every respect except, perhaps, in some cases the condensing unit (an electric motor or an engine and a compressor) is placed somewhere away in a cellar or a closet, and a pipe carrying either a refrigerant or refrigerated water is connected to it from the cabinet. In both the systems, the temperature is controlled automatically by means of a thermostat, and humidity by means of a humidistat.

Figs. 28-30 show diagrammatically the two systems of air-conditioning.

Fig. 28

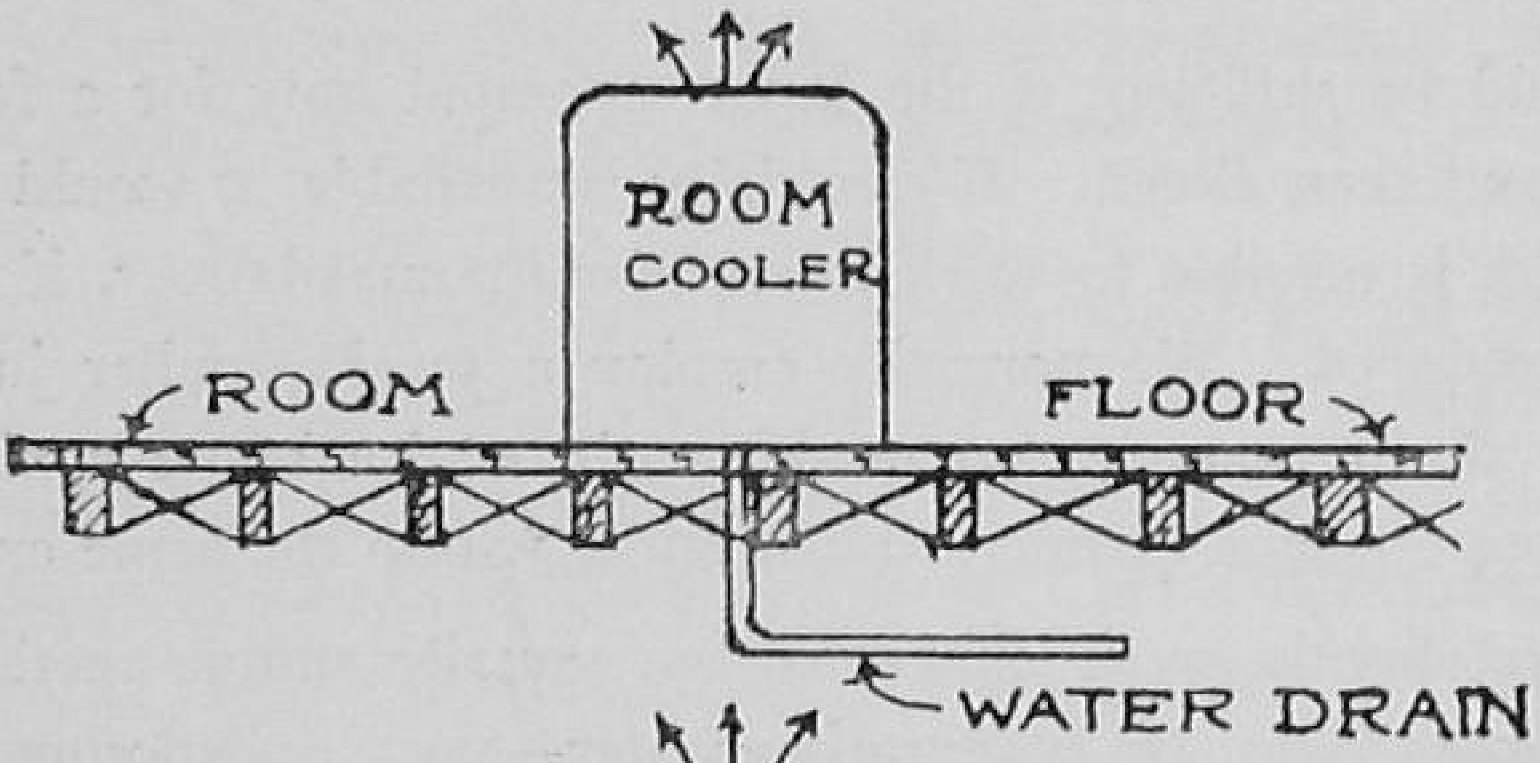

Fig. 29

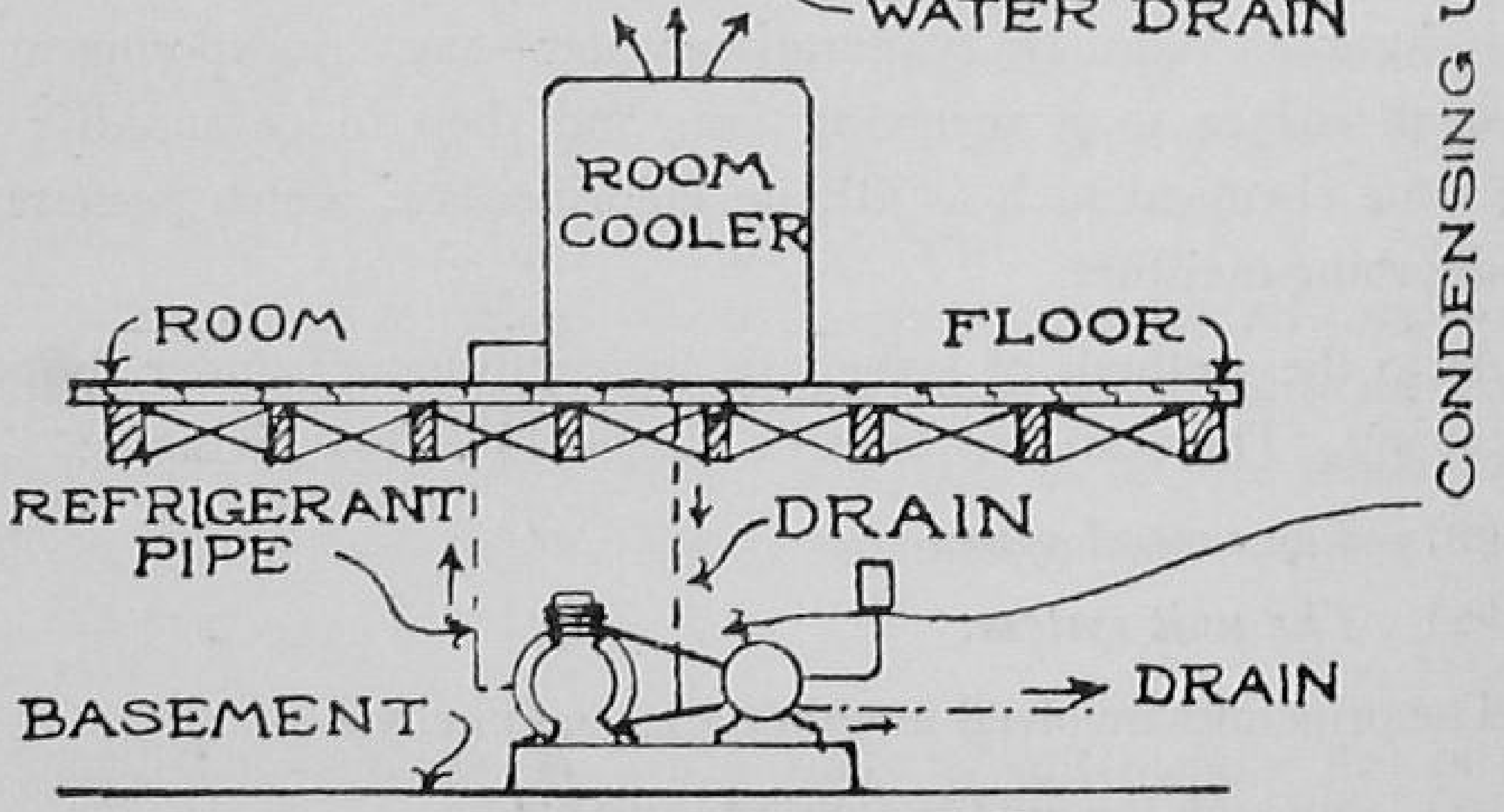

Fig. 30

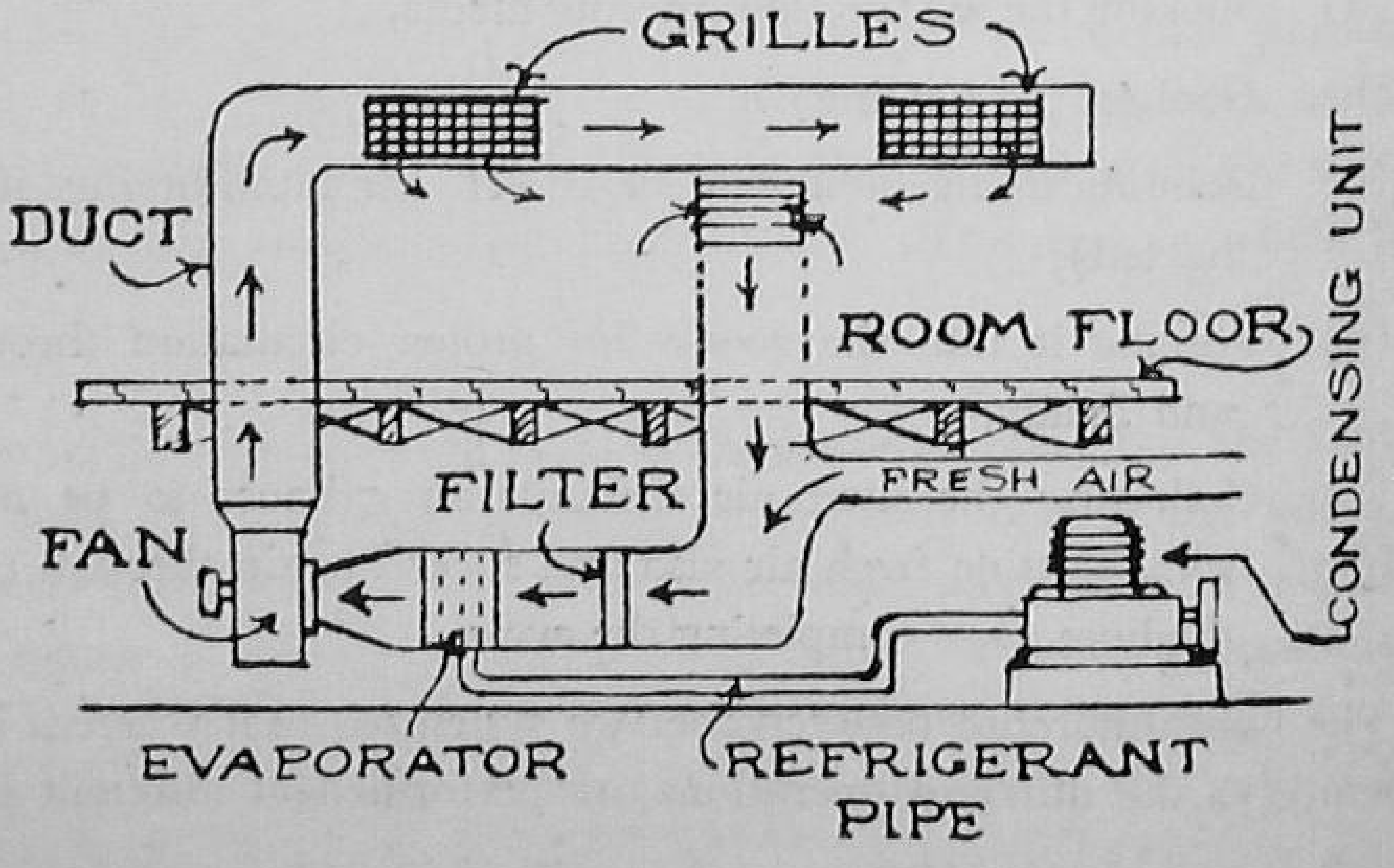

Fig. 28 shows an air-conditioning unit, self-contained in every respect, placed on the room floor. There is a pipe under the floor to drain off water from the cabinet.

In Fig. 29, the conditioner is not self-contained. Its condensing unit, viz., an electric motor or engine and a compressor are somewhere away on the basement floor, and a refrigerant and drain-pipes are connected to it.

Fig. 30 shows the central system of air-conditioning. The condensing unit with evaporator and fan are all stationed in the basement floor, and cooled air is carried by ducts to all the different rooms in the house.

The filtering medium used is any fibrous material, such as spun-glass, steel-wool, porous paper, wood-fibre, cloth, etc., either dry or wetted with oil, so that the particles of dust should adhere to it.

Sometimes, instead of using filters, a spray of water is ejected into the path of the air current, and thus the air is literally washed of all dirt and dust. This washing helps either humidification or dehumidification, as the case may be. For, if the water used is warm, the air is heated and, therefore, absorbs moisture from the spray. If, on the other hand, the water is cold, the air, while being cooled, gives up part of its moisture.

The cooling is effected in several ways: by water, air, chemical sprays, and refrigerants, etc.

One very cheap method of cooling by water is suitable when a deep well is close to, or inside the house. The water of a deep well is usually cold enough. It is pumped and forced into a cooling coil which is placed inside the duct carrying the filtered air. The latter, when cooled, loses some of its moisture, and thus both cooling and dehumidification take place, and the pumped water, after it cools the air, is allowed to return to the well.

Another method which is cheaper as regards initial investment but costlier in maintenance, is to melt ice with a spray of water and pump the water into cooling coils.

By far the commonest method is to cool the air by means of one of the refrigerants, such as methyl chloride, freon, etc. In large-scale air-conditioning plants, the power unit (an electric motor or oil engine or steam engine) and a compressor are installed in the basement as in Fig. 30, and either the compressed refrigerant itself is pumped into coils for cooling the air directly, or water is cooled by allowing the refrigerant to evaporate, and then pumped into coils. In the self-contained units, a small electric motor does all this inside the cabinet.

For winter air-conditioning, instead of a refrigerant or cooled water, steam or hot air is introduced into the ducts by means of separate heating coils.

14

SOUND-PROOFING FOR PRIVACY

THE MODERN practice is to build only the outer walls thick enough to resist heat and also afford a protection from burglars, and to build all the inner walls as partitions of a thin section. This effects economy, both of space and money, but possesses two disadvantages, viz., (i) that no wall cupboards can be provided, and (ii) that sound is likely to be transmitted from one room to the other across the thin partitions, unless they are made sound-proof by some special means. In fact, the first is not a disadvantage as is commonly supposed, because closets with thin walls as described on page 54, which are more efficient than wall-cupboards or even removable wardrobes, could be easily provided. Both these occupy less space and can be made at considerably less expense than a solid wall built right from the foundations simply for the sake of wall cupboards, as many people thoughtlessly do. However, the second disadvantage, viz., that sound is likely to be transmitted through the thin partition, is real and must be remedied. Privacy in respect of sound is necessarily required in bed-rooms, bath-rooms, sanitary closets, study-room and the prayer-room, otherwise much of the pleasure a home is expected to give is lost.

The science of sound-proofing has made such great strides of late that it is possible to eliminate all the noise by means of even a thin partition. In Radio City, in the Rockefeller Centre Building, New York, a brass band playing in one studio is absolutely unheard in another studio only ten feet away. This is, however, very expensive to accomplish. What is aimed at normally in a home is not the complete elimination of sound, but reducing its intensity and making it unintelligible, and this can be done very easily at a small expense.

It is commonly known that sound causes vibrations at its source. These vibrations set up waves in the air, and it is these waves which travel from one room to another. Now these waves may pass directly through key-holes, chinks, and cracks in the door-openings, even though the shutters may be closed, or they may strike the surface of the partition and set up vibrations in the particles of the material of the latter, and may be reproduced at the opposite face. In the first case they pass unimpeded, so that the sound in the adjoining room is distinctly heard. In the second case, much depends upon the material forming the partition. If it be soft and resilient, like cork, rubber, etc., or of a spongy, loose, fibrous nature, the waves striking the material are damped and distorted and the result is that the sound reproduced on the opposite side is low and unintelligible.

The surface treatment of walls has a great effect on sound transmission, and for this reason a lining of felt or cork is used on the inside surface of the walls in a wireless studio. But it is out of the question for homes, as such a surface is bound to collect dust and be difficult to clean. The question, therefore, reduces itself to constructing a hollow partition and to filling the cavity with a loose material of a powdery, granular, or fibrous nature which is less resonant, so that the sound waves may be materially damped before they reach the other surface of the partition. Here again, as in insulating against heat, material of a mineral origin is to be preferred to that of vegetable origin. The Loose-fill type of insulation and, to a certain extent, the Blanket-type, also described on page 112, would provide reasonable sound-proofing also. A hollow partition, i.e., a partition with its cavity filled with air, does not help sound-proofing.

To recapitulate, all key-holes, chinks, and crevices must be properly closed, and cavities must be provided inside the partition walls and filled with some loose material; this would afford sufficient privacy in respect of sound ordinarily required in homes.

15

ARTIFICIAL LIGHTING

THE OBJECT of lighting is to see things distinctly and with ease and comfort. Though the organ of sight has marvellous powers of adaptation to changes, it is overstrained when severe contrasts in brightness or very sudden changes in the intensity of light occur. The requirements of an ideal lighting installation are:

(1) Steadiness of the source of light.
(2) Elimination of glare.
(3) Avoidance of shadows.
(4) Sufficiency of illumination to suit the nature of the visual task.
(5) Non-production of excessive heat.
(6) Minimum consumption of oxygen from the air.

(1) There should be no appreciable fluctuation or flickering of light which overstrains the eye.

(2) Glare of the vision is likely to occur if gas or incandescent electric lamps are used. It may be remedied by (a) Placing the source of light high above the level of the eye, so that it is not ordinarily seen, and (b) Screening the light by means of a suitable shade, or interposing frosted or opaque glass, silk, celluloid, etc., so as to diffuse and soften the light.

(3) Inconvenient shadows can be avoided by (a) Proper shading of the source of light, (b) Using light colours on walls and ceilings which reflect and diffuse light in all directions, and (c) Providing a general mild light to illuminate the entire room, and one or more stronger lights, in addition, at proper places for specific purposes such as reading, sewing, etc.

(4) For the comfort of the eye and efficiency of the particular visual task, the proper degree of illumination is required. Thus, reading requires more light than playing at cards, and for sewing more light is required than for reading.

(5) Production of excessive heat is a great disadvantage in a tropical country like India, particularly in the summer.

(6) Except the incandescent electric light, every other source necessarily consumes oxygen from the air.

Electric light (except the arc-light which is now rarely used) is the best, as with proper shades and reflectors it fulfils all the above conditions. However in India, except in cities and a few large towns where it is available

at present, people have to depend upon oil lamps for ordinary use, and gas lamps on ceremonial occasions.

When oil lamps are used, it is customary to keep a small lamp burning the whole night inside a bed-room. Even though its flame may be turned down very low, it is sure to vitiate the air in the bed-room where, generally, the arrangements for renewing it are imperfect. It acts adversely in three ways: firstly, it consumes part of the oxygen from the air. Secondly, it produces carbonic acid gas, water vapour and heat. Though these may be in small quantities, if the flame be very small, still the combined effect is of no small consequence. Thirdly, the imperfect combustion, which is the necessary result of the low flame, fills the atmosphere of the room with myriads of particles of soot. Anyone entering into such a room, shut up with a burning light for a few hours, will easily perceive it by smell.

With electric lights we have a choice of three different methods of lighting:

(1) Direct lighting, in which light is derived directly from the lamp without any interruption or diffusion.

(2) Indirect lighting, in which the source of light is completely shielded, and its rays are first thrown on the ceiling and the upper portion of walls, whence they are reflected and diffused throughout the room.

(3) Semi-indirect lighting is a combination of both the above principles—part of the light is uninterrupted and part thrown on to the ceiling and walls, and thence reflected.

In India, as electricity is fairly expensive so far, the first method is in general use, though it is being gradually superseded by the second in cities where electrical energy is growing cheaper and cheaper.

With a reflector or a shade on the top and direct light below, maximum lighting power is used in the first system; still the eye very often sees the brilliant filament inside the lamp, and is strained.

With indirect or semi-indirect lighting, glare is eliminated. The diffusion of light from large surfaces gives soft shadows, causes the light to penetrate into every corner, and avoids inconvenient reflections of light from polished metal or book-surfaces. But it consumes more than twice the electrical energy required for direct lighting. Hence it has so far been a luxury which only a very few rich families can enjoy.

The efficiency and economy of indirect lighting depend upon two things—firstly, a scientifically designed reflector of proper material, and secondly, a flat, plain ceiling and walls, light in colour and with a matt finish. If the ceiling surface is broken up by ornamental decoration, it reflects less light, and if the surface finish is not matt but shiny, a bright image of the source of light is seen in it which, just like directly exposed light, strains the eye.

Semi-indirect method possesses advantages of both the direct and indirect lighting. There are fittings available in the market, so designed that the proportion of direct and indirect light can be regulated to suit our requirements with the two systems independently switched, so that the fittings could be used either for indirect or direct lighting or, alternatively, as a combination of both. Thus, even though the fittings are initially costly, they result in a saving of electrical energy as compared with the indirect system, though all the advantages of the latter are derived.

For any of these systems, either pendants, suspended by a flexible wire from the ceiling, wall-brackets, table-lamps, or floor-standards may be used. The latter, in particular, are very convenient, their use dispensing with the difficult problem of settling the positions of lighting points, and if a few plug points are provided, one or more of these lighting standards connected to them by flexible wire could give sufficient light anywhere in the room.

The intensity of a source of light is measured in terms of *candle-power*. The unit commonly employed is the *foot-candle*, which is the illumination received by one square foot of perpendicular surface at a distance of one foot from the source. In the lighting of our homes by electricity, however, we are more concerned with the wattage of the lamp, and this depends upon several factors such as the system of lighting (whether direct, indirect, or semi-indirect), the reflecting material and shape of the reflector, the colour and texture of the ceiling and walls and the size of the room, height of ceiling, and so on. Pure white colour reflects about 84 per cent, and at the other extreme is crimson, which reflects only 6 per cent. In between these is the whole range of light colours. Pale cream, light buff and primrose are good reflectors, then come grey, blue, green and red, which are poor reflectors.

The relation between watt and candle-power depends upon the construction of the lamp, both in respect of the material of the filaments and the gas filled in. Of late years, great improvements have been made in the lamp, and in the best lamp as low as 0.1 to 0.3 watt (amperes × voltage) is required for giving an illumination of one candle-power with a good reflector. This shows the importance of using lamps made by reliable firms of long experience.

even though they may be initially a little more costly. The so-called "cheap lamps" are assuredly dear in the long run.

For the sake of economy, it is desirable to provide a lamp of low illumination, say 3 to 4 candle-power of light on the floor, placed centrally in each room for general lighting, and lamps for local lighting of the necessary candle-power for specific purposes, such as reading, needlework, etc., either in the form of wall-brackets, table-lamps, or floor-standards. Passages and, particularly, staircases should be adequately lighted. The kitchen should have a strong light. The lights in the dining-room should be directly over the table. The general lighting of the bed-room should be of a soft, restful nature and stronger diffused light should be provided in the dressing-room.

A FEW PRACTICAL HINTS ON ECONOMY IN LIGHTING

(1) It pays in the long run to use a costlier wire than spending on decorative fittings. Besides, ornamental fittings are difficult to clean.

(2) It is advisable to use lamps manufactured by a firm of long standing and repute, though they may cost more in the beginning. They will pay their extra cost in two or three months only, by effecting a saving in electrical energy.

(3) Instead of using lamps of high wattage, it is possible to derive the same illumination with lamps of much lower wattage by (a) providing a scientifically designed reflector, (b) adjusting the distance or height of the lamp, and (c) fixing them just at places of maximum advantage.

(4) The shades or reflectors should be cleaned from time to time with soap-water. Dust, if allowed to be deposited on them, absorbs light.

(5) If a switch is found to get warm, it should be immediately replaced by a new one.

(6) The flexible wires should be occasionally examined. If at any place the cover is worn out, exposing the copper wire inside, it should be replaced by a new piece. The flexible wires should be renewed every three or four years; by the action of the atmosphere they deteriorate.

16

AN IDEAL HOME

SPECIFICATIONS

(1) That it shall provide excellent facilities for cooking, dining, sleeping, rest, entertainment, toileting, children's activities, study concentration, and storage.

(2) That it shall be built to endure—built in such a manner that strength and stability shall be reflected in every part of it.

(3) That it shall shelter and protect the inmates from the elements, and afford them perfect health, ease, comfort, and happiness as a combined result of excellent workmanship, faultless sanitation, proper orientation, necessary privacy, perfect flexibility, and unobstructed circulation.

(4) That it shall reflect the personality of the family in it, with the individuality of appearance impressed upon it. A home—plain, simple, unobstrusive; yet neat, tidy and sublime, both in appearance and in quality.

(5) That it shall suit the family's purse, and shall be capable of expanding as both the family's demands and income increase.

(6) That it shall be a home where the glory of Love, the joy of Happiness, and the peace of Contentment shall reign forever. A home where little voices shall babble in the joy and innocence of babyhood, and grow to healthy childhood, boisterous and noisy, then gradually to full, blushing youth, and in the process of evolution, come to maturity and grey old age, finally in fulness of time to rest in eternal peace.

(7) That it shall be the delight of children, the rallying-point or centre of the family, that shall attract its many members and hold them together, knitting generations, each to each. A home which shall forever remain the dearest spot on earth, not because of its cost, nor because of the richness of the materials and furnishings, but because of the happiness it has given, the storm and stress it has faced, the tears it has dried and the smiles it has raised.

17

INTRODUCTION TO PLANS

In presenting the plans in the following pages, it is far from my intention that they should supplant the valuable and special services of architects. They are given rather to create an interest in the minds of laymen in the study and analysis of the plans and elevations of houses designed by architects, and to enable them to appreciate what really constitutes the difference between good and bad planning. They are given with the further object of illustrating the many comprehensive new ideas suggested in the text in the foregoing pages, reference to which is frequently made in the notes on the plans.

They are, however, never meant to serve as "type" plans to be blindly adopted. No type plan, howsoever good, can ever satisfactorily fit the varying conditions such as the aspect, prospect, location, orientation, etc. *A type plan is lifeless; it lacks the personality which every home, with its individual aspirations and sentiments, must necessarily possess.* A house must fit the family as clothes do the wearer. It must also reflect the personality of the family as the dress reflects that of the wearer. Type plans are like ready-made clothes and cannot be accepted without a certain amount of compromise and sacrifice.

Although copious notes on constructional details are given on each plan, nothing can be more strongly recommended than the advice of an architect or engineer before construction is started. For instance, there are a number of plans here in which the walls on the upper floor are not supported by similar walls below them on the lower floor. This condition was deemed quite essential a few years ago, but has now been more honoured in its breach than in its observance with the present-day new materials and methods of construction. If such a wall is to be built without a supporting wall below, it can be built hollow, of very light wall sheets (of which there is a large variety in the market), which would not only occupy less space and be very light, but would also be reasonably heat-proof, sound-proof, fire-proof, and secure against burglars. Another way to accomplish this is to give a support to the wall in the form of an R. C. C. beam, either exposed to view or concealed within the floor, and to build the partition above it also of R. C. C. designed to make it support its own weight, either partially or wholly.

Reinforced concrete is a very simple but, at the same time, a most dangerous material to handle on the part of the layman. A wooden or even a steel beam, if wrongly designed or wrongly laid in position, might bend and form an ugly sag, or might crack, and even if it collapses, it would give

ample warning beforehand. But if the steel reinforcement of an R. C. C. beam is bent in a manner reverse of what is properly required, it would suddenly collapse as soon as the centering is removed. In the hands of a qualified person, however, and with the spread of technical knowledge, this thing is of very rare occurrence at present. This is mentioned by the way as a warning to the lay enthusiast.

Plans of "Row-buildings" or "Terrace houses" are first given, followed by "Flats" or semi-detached houses, consisting of tenements of a single room, two rooms, three rooms, and more, and lastly, plans of detached cottages and large houses in the order of their increasing costs.

Mention has already been made while introducing the book, about the costs. They must necessarily vary, not only from province to province, or district to district, or town to town in the same district according to the kind, quality and rates of materials and labour, but also at the same place, according to the fluctuation of rates of materials and labour from time to time. They were purposely omitted in the previous edition. But even though it is 2½ years since the war ended they are still widely fluctuating. At the suggestion of several friends, therefore, pre-war costs are now again given.

For the guidance of some laymen who have seldom seen plans, a typical plan is given below in Fig. 31.

A, A, (diagonal dotted cross lines), indicate arches; W, W, (double lines along walls near the outer edge, windows; C, C, (recess in walls), cupboards; D, D, (break in walls), doors; St. (steps with double lines on one side), staircase; CH, *chulla* range in kitchen; S, sink; SF, shelf; B, (rectangular figure in bed-room), position of beds; N (arrow line with N toward the pointed end), North direction. The above plan faces West.

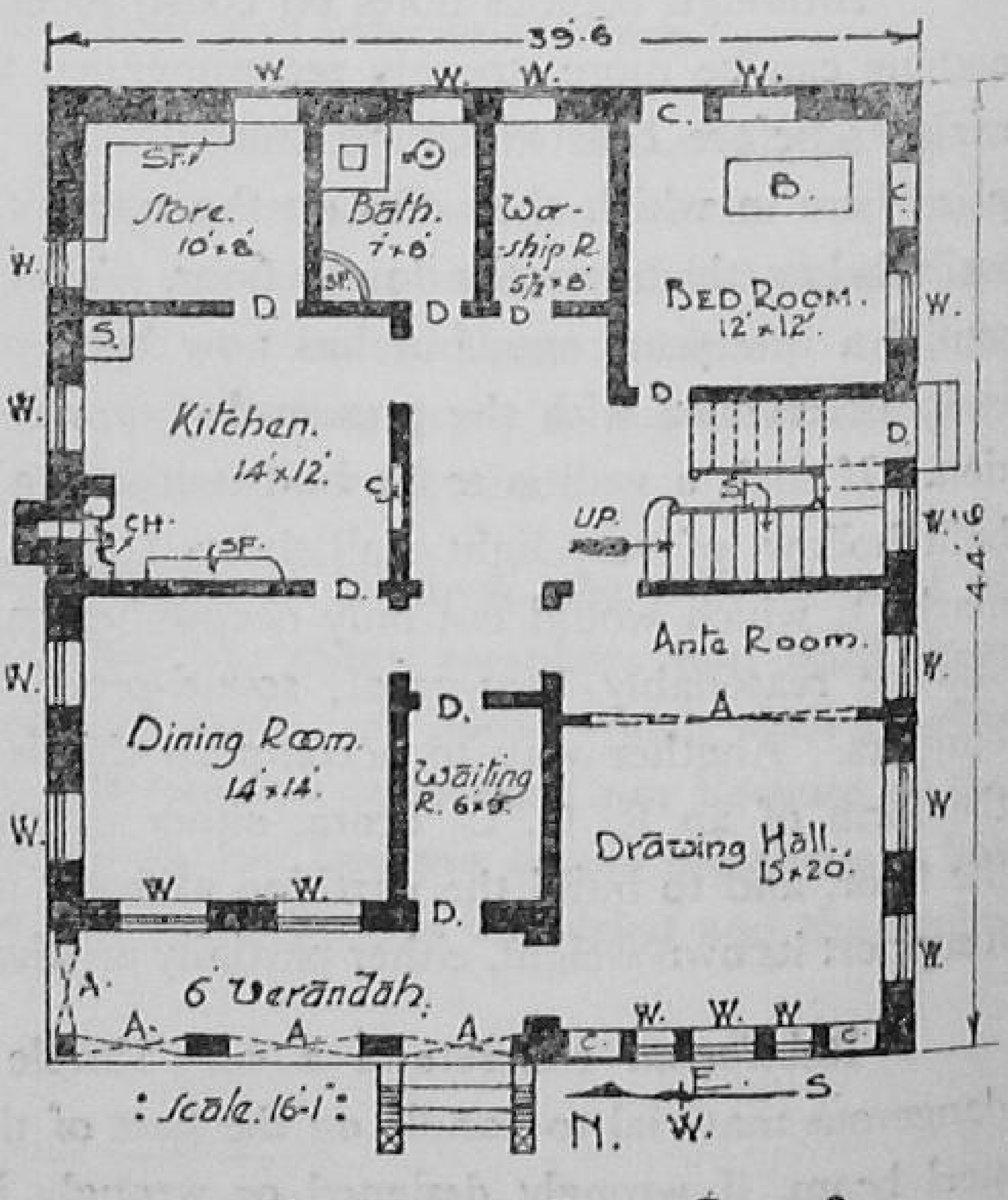

Fig. 31

18

ROW-BUILDINGS OR TERRACE HOUSES

This is the cheapest and simplest type of dwellings suitable for very poor classes. They are mostly erected in industrial cities where the cost of land, particularly on the front lining the streets, is very heavy. Reducing the width of the house-front helps in lowering the cost of the building scheme. This fact has led to the construction of row-buildings, which consist of narrow tenements divided by common side walls. The disadvantages of row-buildings are that the houses are narrow and, since the sides are closed, light and ventilation have to be derived only from the front and rear sides. However, in respect of privacy and independence, they are better than *chawls** which are mostly peculiar to Bombay. Row-buildings have the further advantage even over "Flats" that they all have an equally favourable aspect in respect of sunshine and breeze. In the case of "Flats" or apartment buildings, whereas the tenements on one side derive the full benefit of proper orientation, those on the other side are quite at a disadvantage in this respect.

Row-houses are very popular in Germany, Denmark and Holland. U. S. S. R. has also adopted them in large numbers. In England, France and the U. S. A., however, flats are preferred to them.

In order to reduce the cost of the development, the following measures of economy are recommended:

(1) Reducing the value of the undeveloped land by limiting the number of tenements per acre of land—both by restricting the number of blocks of buildings and also the storeys. This can only be done by the State or Local bodies.

(2) Reducing the total road surface to be constructed by (a) reducing the width of the metalled surface to 9 or, at most, 12 ft. (the road itself may be 20 to 30 ft.); (b) building blocks back to back with a narrow lane between for sanitary service; (c) making the general lay-out in such a way as to avoid cross roads as far as possible. With reduction of the length

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**Chawls* are buildings, generally 2, 3 or 4 storeys high, so constructed as to be suitable for letting, in separate tenements, of a single or two rooms, but not more than two rooms. There is only one central semi-fire-proof staircase as the main thoroughfare for the upper floors; each tenement is separated by party walls. There is a common passage about 4 ft. wide, either in front or at the rear. One or two wash-houses and bath-rooms and a few w. c.'s, which are always inadequate in number, are provided for common use. The *chawls* tend in general to establish a low standard of comfort and decency, and have often a demoralising effect.

of roads, reduction also incidentally occurs in the length of water and electric mains and sewers and drains.

(3) Concentrating building activity so as to erect as many units as possible at a time. This results in economy as it enables pre-fabricated, standardised building parts to be used and large-scale purchase of materials to be centralised.

(4) Reducing the height of ceiling, which can be safely done if windows are carried almost to the height of the ceiling and provided with ventilators.

(5) Providing conveniences and gadgets in the houses, such as wall-cupboards, shelves, lofts, drying-lines, cradle-hook, roof-pendants, etc., and curtailing the floor area correspondingly.

The minimum standard of accommodation, recommended by the National Planning Committee, is:

Main room	15′ × 10′	= 150	sq. ft.
Kitchen	8′ × 6′	= 48	" "
Verandah	9′ × 6′-6″	= 58½	" "
Bath-room	7′ × 3′-6″	= 24½	" "
W. C.	4′ × 3′	= 12	" "
	Total	293	" "

This is exclusive of walls. The height of ceiling recommended is 9 ft.; window area, one seventh of the floor area. It is further recommended by the National Planning Committee that not more than 20 tenements, distributed over 2 floors, and density of not more than 100 persons, or 20 to 25 tenements per gross acre, should be allowed.

In a rural area, provision for stabling of live-stock, storage of field produce and fuel has to be made in addition to the above.

While designing and constructing houses for the working classes, habits and religious sentiments of the people who will occupy them must be taken into consideration. For example, roof-ventilators, clerestory windows or honey-combed portions in walls should be provided so that either through ignorance or fear of draught or insecurity, even if all the windows are closed, sufficient fresh air can get into the rooms. Similarly, waste water from bath-room or slop water from kitchen should flow at least 15 ft. away from the house before it soaks into the ground exposed to the sun, if underground drains are not provided.

PLAN NO. 1

Plinth Area: 450 sq. ft.

Pre-War Cost per tenement: Rs. 1,000

The building represented by Figs. 32-34 is the cheapest type of dwelling house, with a single tenement of a kitchen and living-room on each floor. There is an independent entrance to the upper floor. The rooms are fairly large. As the side walls are thick enough, it is possible to provide a number of built-in wall cupboards in them. The bath-room and w. c. on the

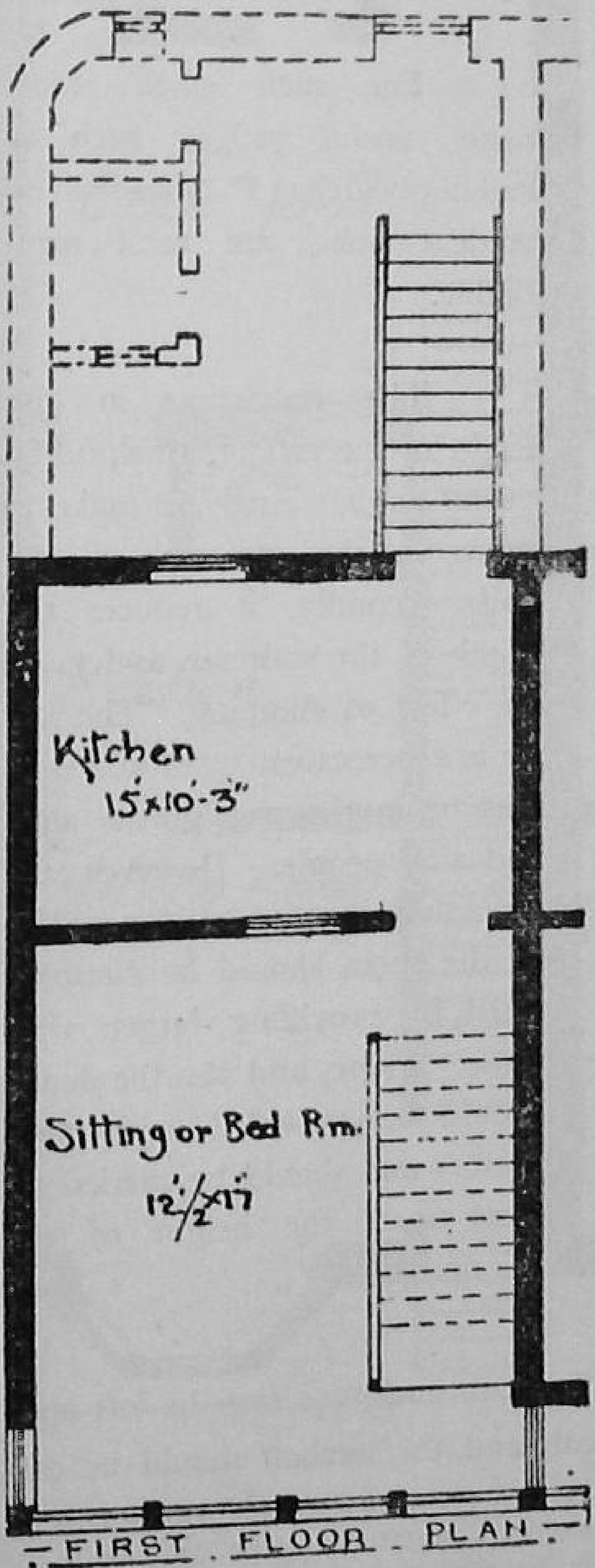
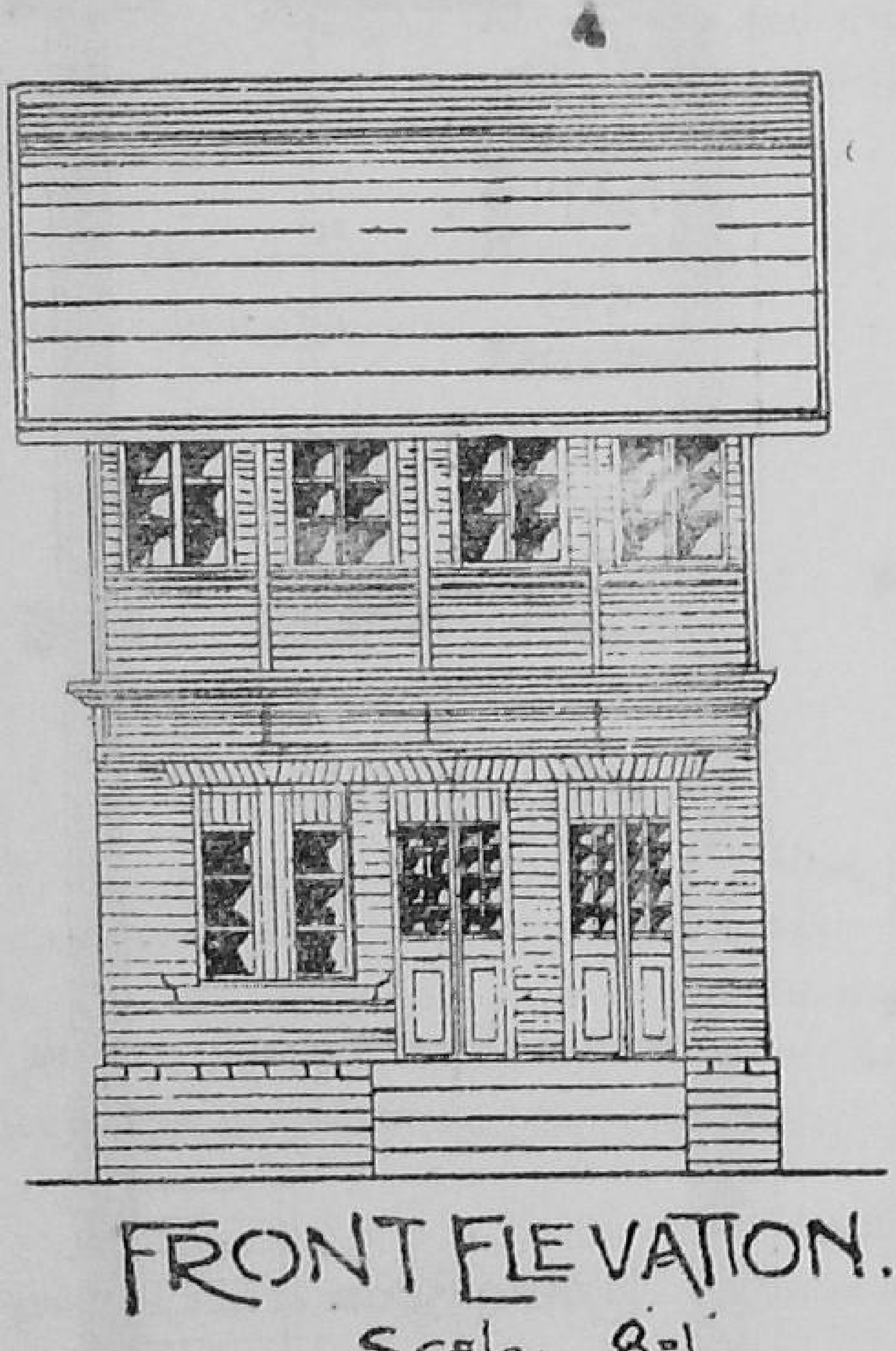


Fig. 32

Fig. 33

rearside are common to both the tenements. There is another independent staircase in the backyard, for the people on the upper floor, for reaching the sanitary services. A door in the rear compound wall provides access to the service lane on the rear side between the front and back rows of terrace houses.

The space below the staircase is useful for storing a cycle or a perambulator. To compensate the tenement on the upper floor for the loss of this space, the front portion of the sitting-room is projected 4 ft. and supported on cantilever beams, so that an extra space of 4′ × 14′ is added to it.



FRONT ELEVATION.
Scale - 8-1.

Fig. 31

For such small tenements, useful gadgets such as wall-cupboards, wall-shelves, pendent-hooks, are most serviceable.

The restriction in the height of the ceiling is helpful in several ways. Firstly, it makes a saving in the masonry of the walls; secondly, it reduces the length of the staircase and saves the effort of climbing. The latter is a permanent gain and is a blessing in the case of the aged and sick people. However, the reduction in the cubic capacity of the room should be compensated by providing larger windows. These, and also the doors, should be provided with ventilators and should be carried almost up to the height of the ceiling.

If more economy is to be effected, the bath enclosure may be left open to the sky. The waste water from the bath and the kitchen should be carried away from the house before it soaks into the ground exposed to the sun, if underground drains are not provided.

PLAN NO. 2

Plinth Area: 440 sq. ft. Total Area: 730 sq. ft. Pre-War Cost: Rs. 3,500.

THE plan shown in Figs. 35, 36 is on the same lines as the previous one and has the same area, but it can be used either by two tenements, one on each floor, or by one family only. There is a bay window in the front. The partition between the kitchen and the sitting-room should be provided with a wide but low window near the ceiling so as to ensure privacy and, at the same time, through ventilation.

Fig. 35

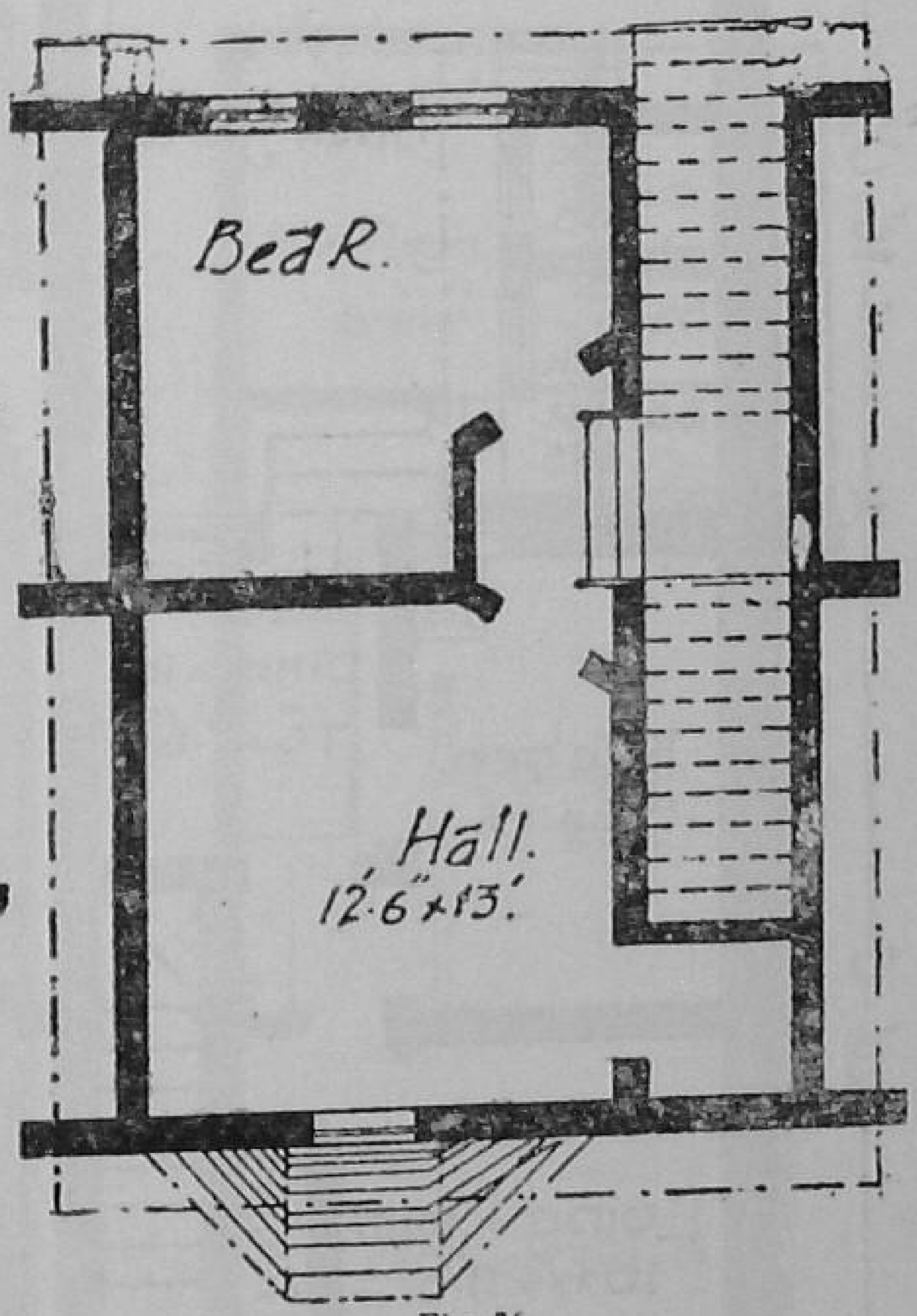


Fig. 36

The staircases in such small homes should not have any winding steps—so as to minimise accidents. This should be done even at the cost of an easy rise. 8½" or even 9" height of steps is justifiable if, thereby, winding steps could be avoided. This has been accomplished in this plan.

PLAN NO. 3

Plinth Area: 810 sq. ft. Total Area: 1,240 sq. ft. Pre-War Cost: Rs. 5,300.

THIS is one of the most economical plans, in which every inch of the space is utilised to the maximum advantage. In a very small space, three rooms on the ground floor and four rooms upstairs, each with independent access to it, and all adequately lighted and ventilated, have been provided for. The two winding steps at the top should preferably be avoided by increasing the rise of every step by an inch. Though a terrace house, its design is suitable even for a decent middle class family of 7 or 8 members.

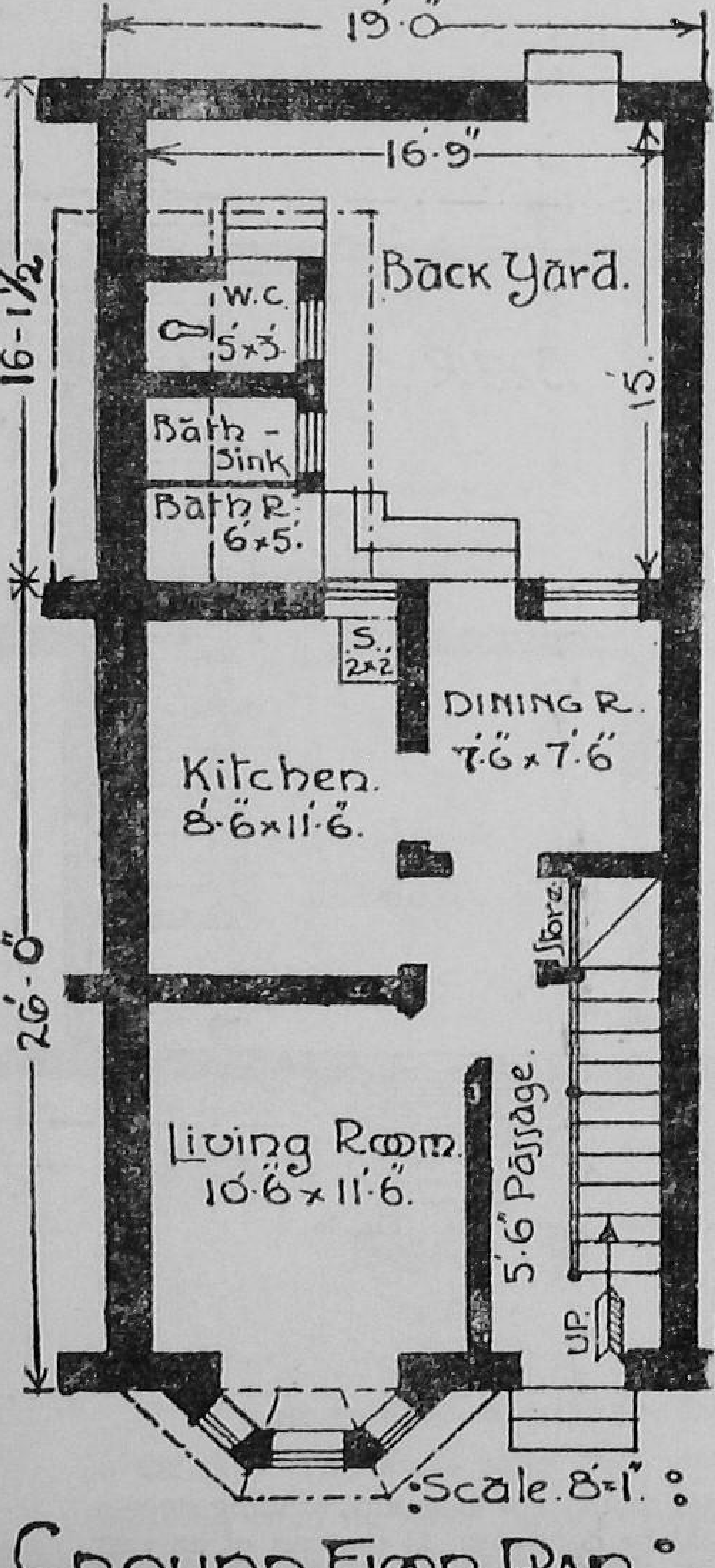


Fig. 37

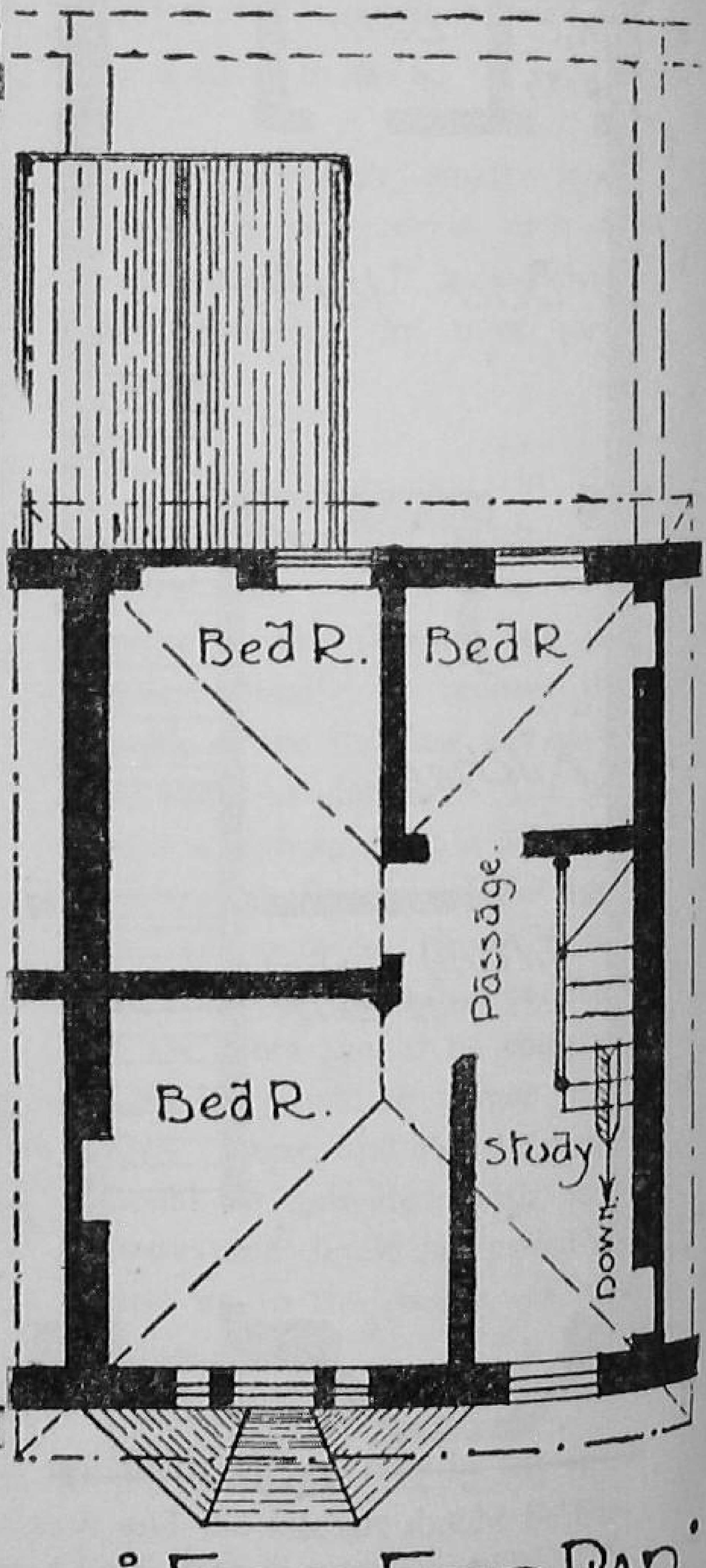


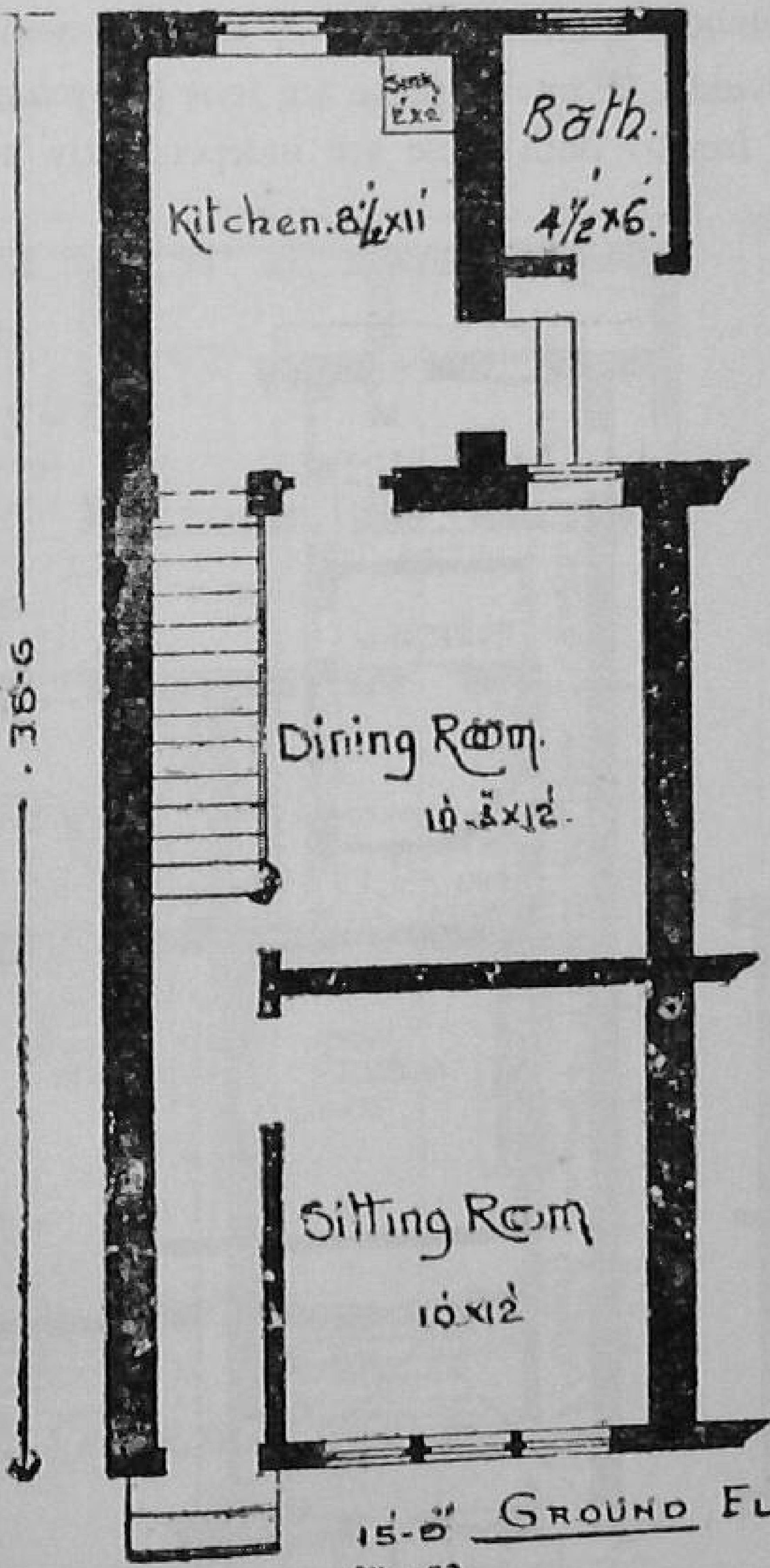
Fig. 38

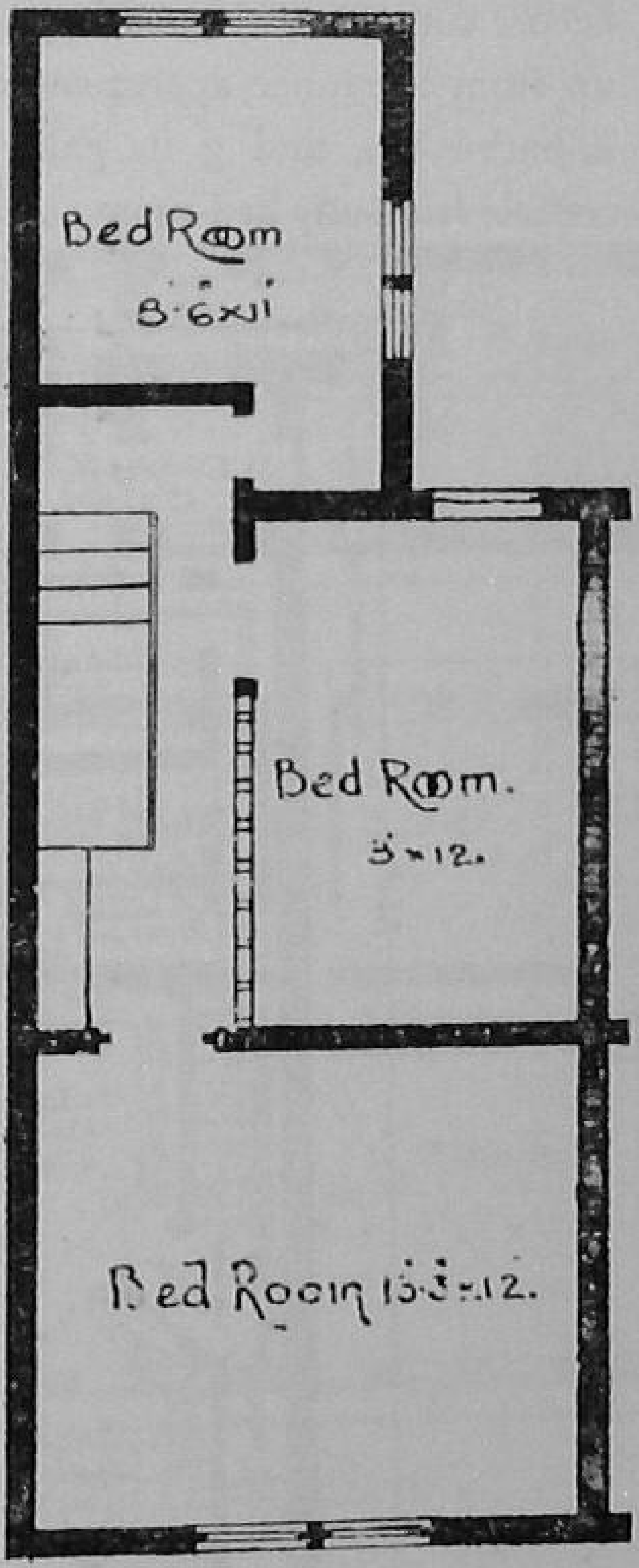
PLAN NO. 4

Plinth Area: 575 sq. ft. Total Area: 1,100 sq. ft.

Pre-War Cost: Rs. 5,000

THE frontage width of this house is only 15 ft. between the centre lines of side walls. There are three rooms, one behind the other; still, each room derives direct light and ventilation from exposed walls. The bath-room is very conveniently situated. There are three rooms upstairs with an independent entrance to each. The accommodation is plentiful and decent enough for a fairly large middle-class family.





15'-0" GROUND FLOOR FIRST FLOOR

Fig. 39

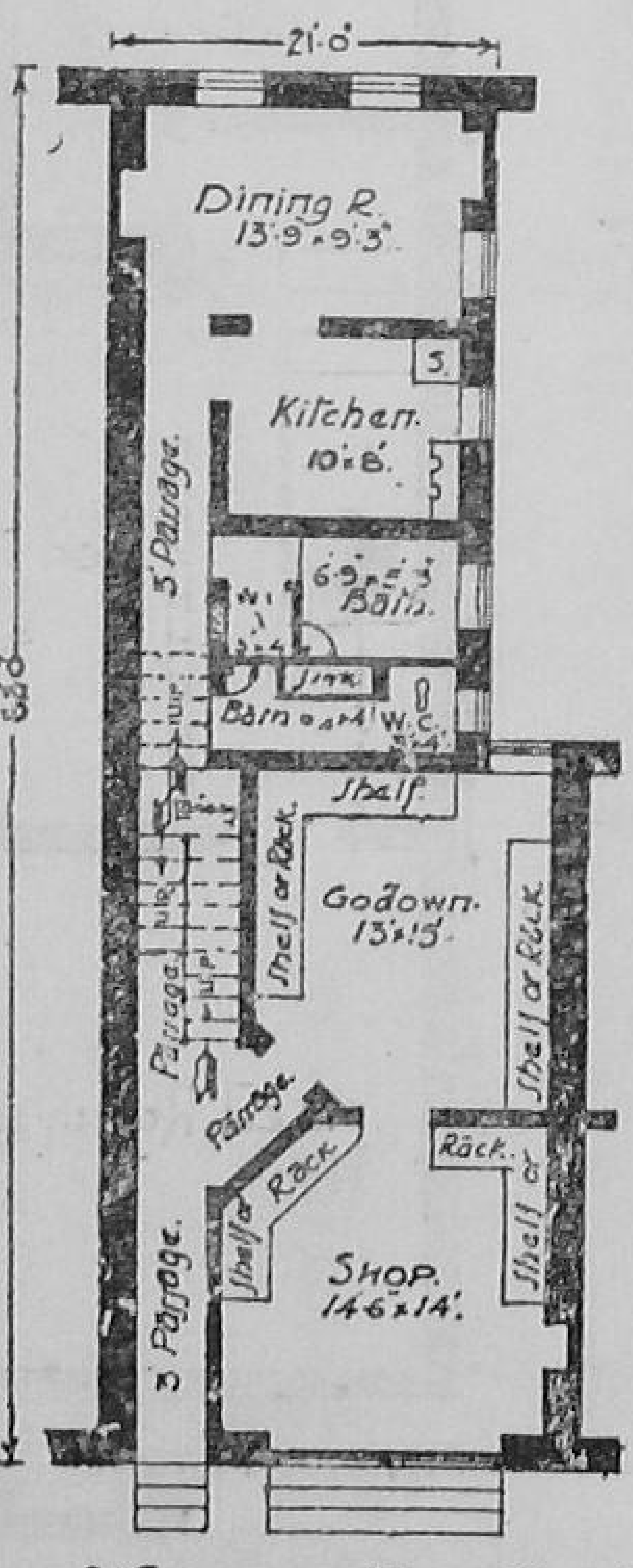
Fig. 40

PLAN NO. 5

Plinth Area: 1,120 sq. ft. Total Area: 2,240 sq. ft.

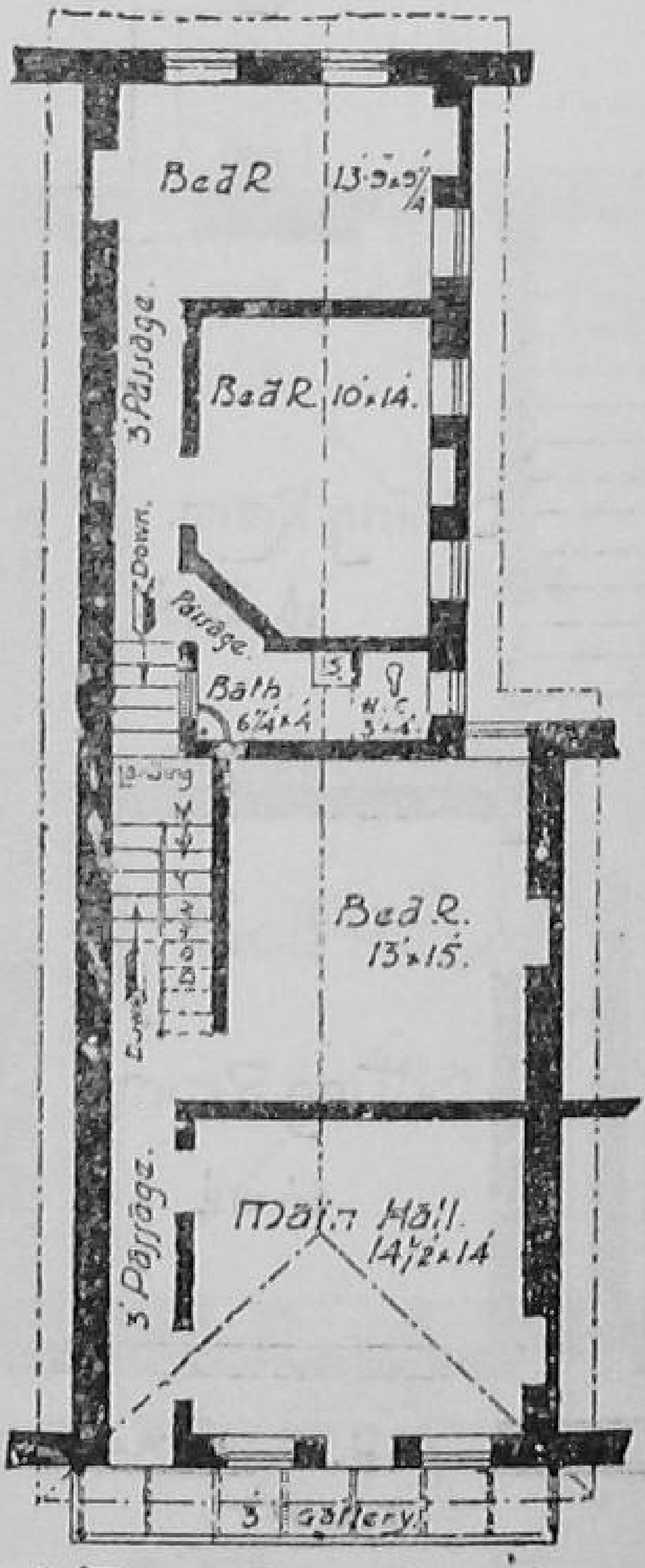
Pre-War Cost: Rs. 10,000

VERY often the front rooms on the ground floor of terrace houses situated in busy parts of a town are very much in demand for shops. The plan shown in Figs. 41, 42 is designed on the principle of row-houses, but modified to suit the altered conditions. There is a show-room in the front, and behind it is a godown. There is a separate passage for reaching the family quarters which may be occupied either by the shopkeeper's or a different family. In the latter event, an independent bath and w. c. for the exclusive use of the shopkeeper and his assistants is provided. An additional flight of stairs for going up from the inner apartment is provided. Upstairs, there are four bed-rooms, a bath-room, and 3 ft. gallery in front. Both these are independently accessible from any bed-room.



: GROUND FLOOR PLAN. :
: Scale. 12'=1" :

Fig. 41



: FIRST FLOOR PLAN. :

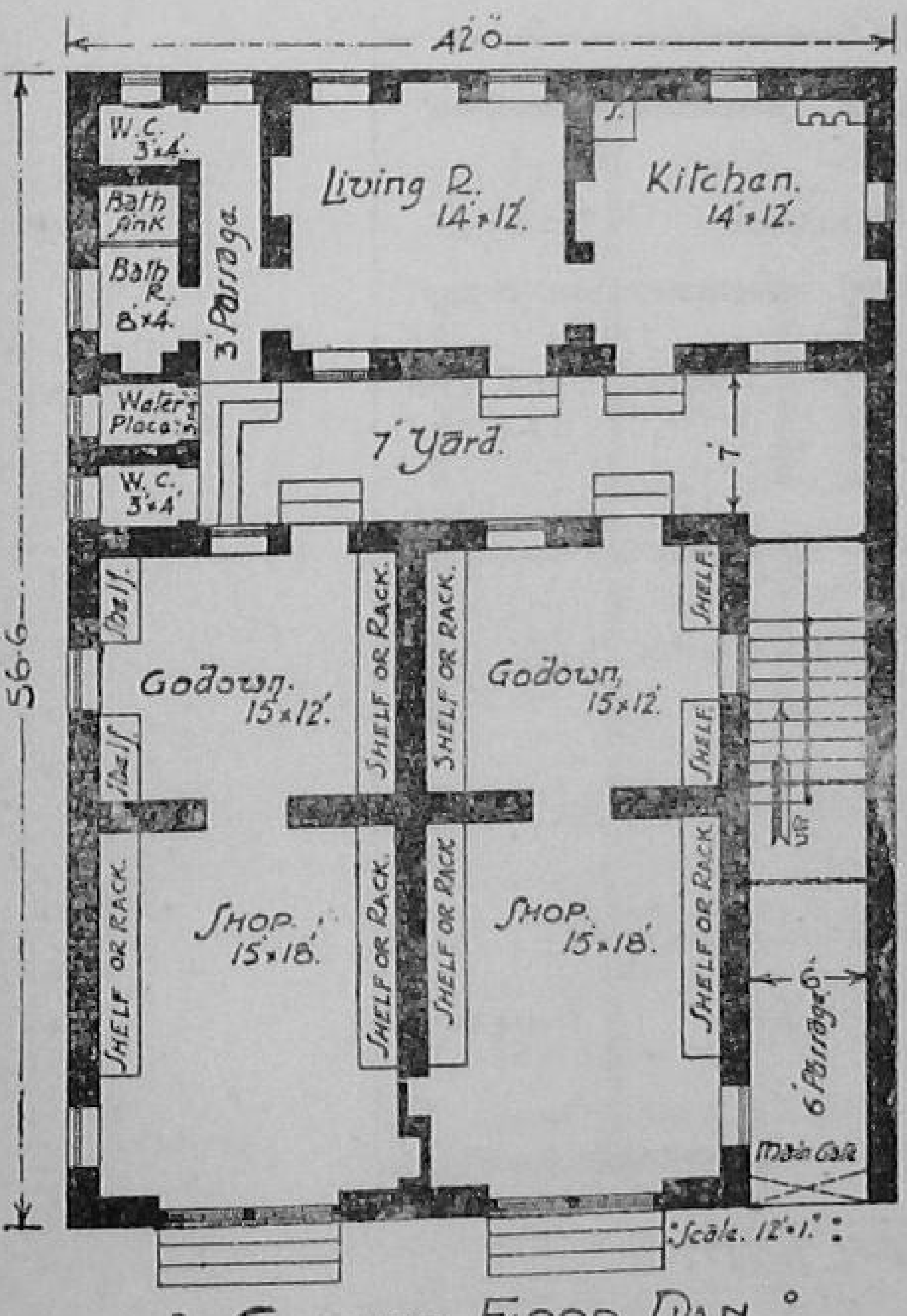
Fig. 42

PLAN NO. 6

Plinth Area: 2,145 sq. ft; Total Area: 4,290 sq. ft.

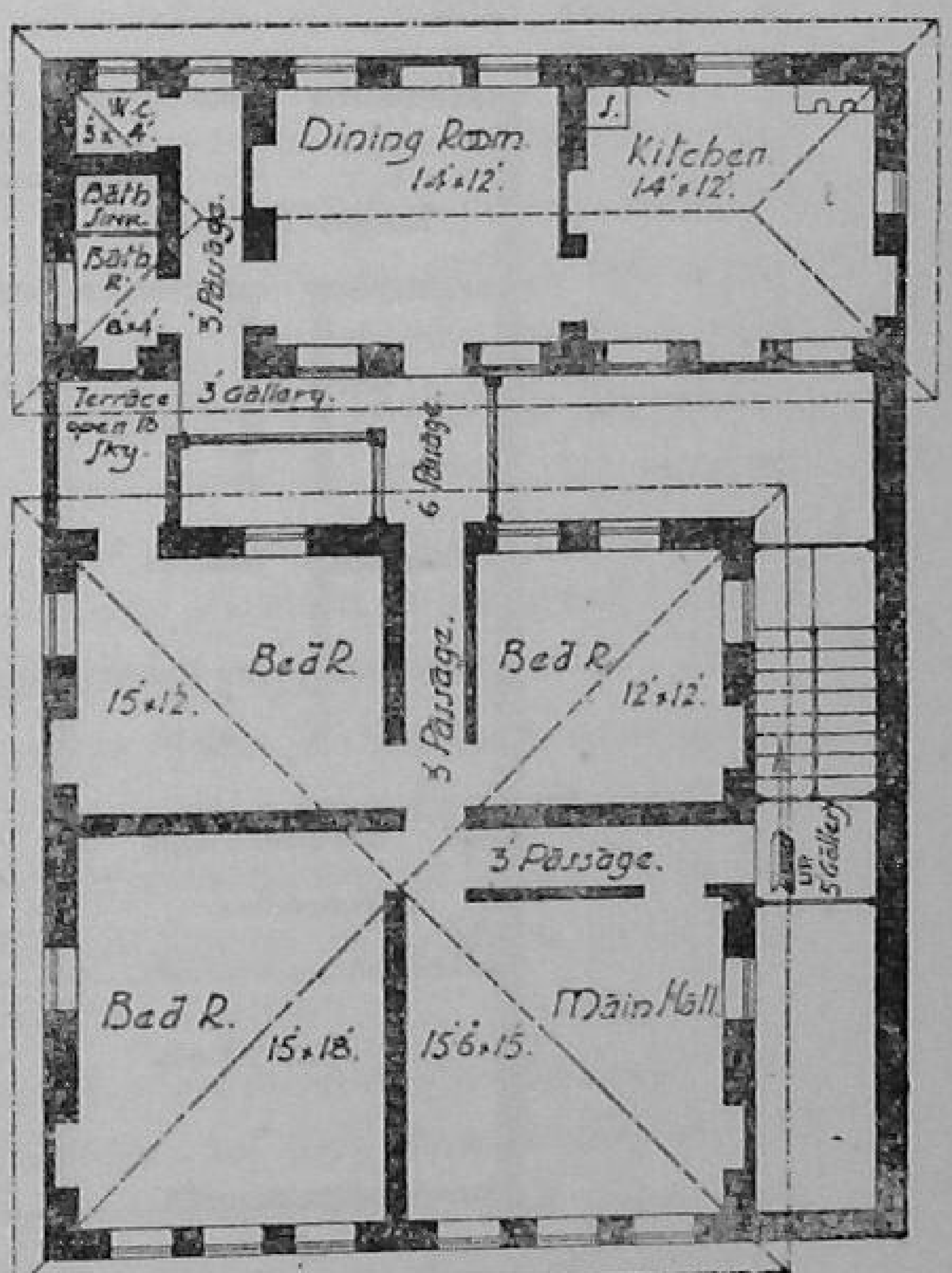
Pre-War Cost: Rs. 18,500

THIS is yet another plan with a shop front. There is a row of two shops in a line, behind which a godown is provided. An open yard behind the godowns separates the shops from the residential block. There is a separate entrance on the right-hand side for the latter. A small tenement of a kitchen, living-room, a bath and a w. c. on the ground floor may be separately rented out. There is a separate bath and w. c. for the use of the shop assistants. Upstairs, there is very decent accommodation of 4 large rooms, kitchen, dining, and bath, etc., for an upper middle-class family.



: GROUND FLOOR PLAN. :

Fig. 43



: FIRST FLOOR PLAN. :

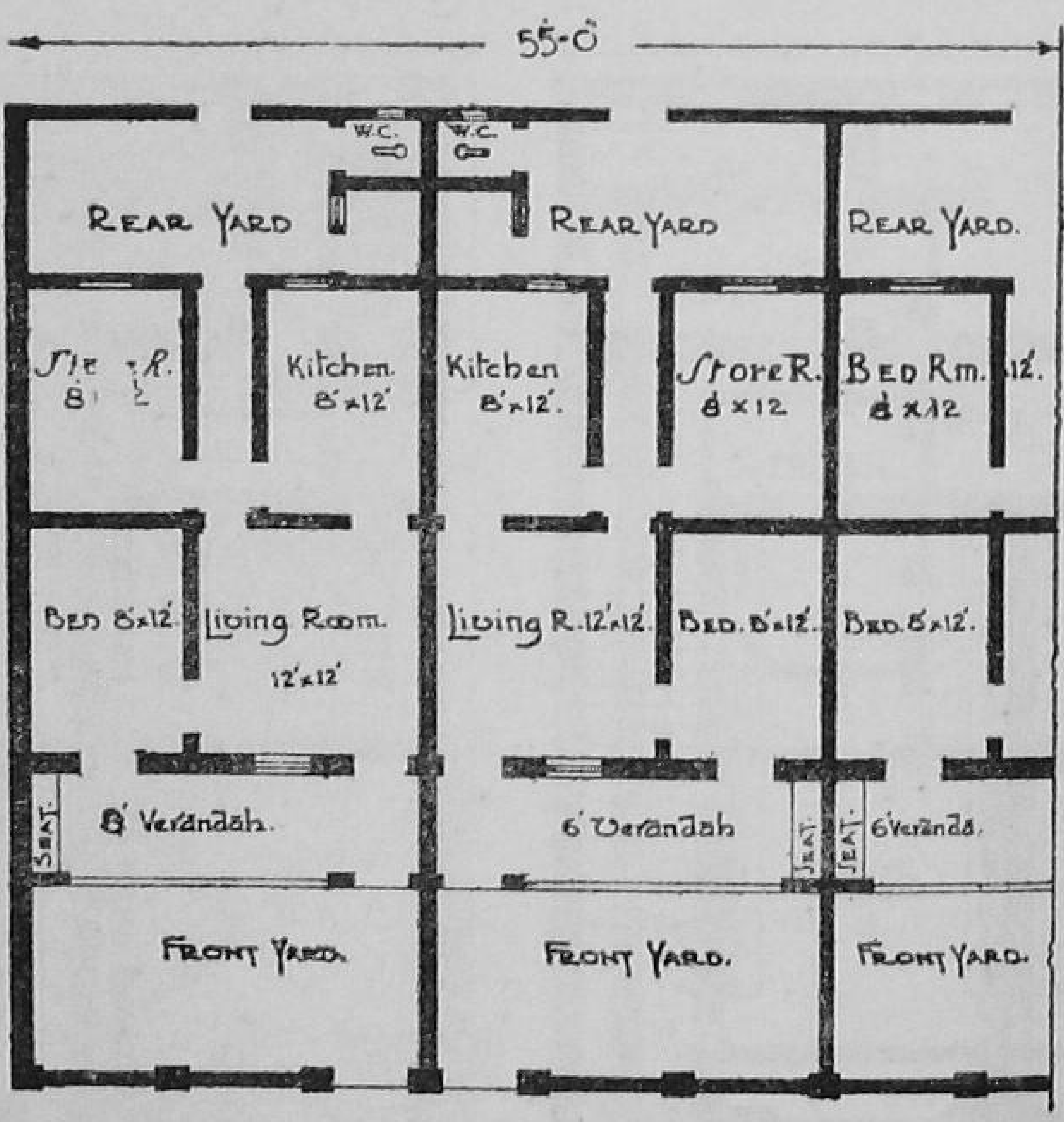
Fig. 44

PLAN NO. 7

Area per tenement: 765 sq. ft. Plinth Area: 780 sq. ft.

Pre-War Cost: Rs. 3,000

THE design shown in Fig. 45 is suitable for rural districts where space is not so much restricted. Each tenement is quite independent of the neighbouring ones separated by blind walls erected even in the front and rear yards. A 6 ft. verandah, two living-rooms, a kitchen and store-room, together give ample accommodation needed by a middle class family of small means. The store-room can be occasionally used as a bed-room. The passage between the kitchen and store-room maintains the privacy of these rooms. The structure consists of ground floor only.



:GROUND FLOOR PLAN:
:Scale-16-1':

Fig. 45

19

FLATS

A FLAT is a self-contained, convenient, small dwelling, within a large building. It is called an apartment house in America. Flats are very popular in the civilised countries of the world, and may be counted by thousands. Notable instances of such modern flats are those at the Mosholu Parkway in New York and Carl Marx and other huge buildings in Vienna. One of the latter is 1,500 metres, or more than ¾ of a mile long, four storeys high, and houses nearly 8,000 families, in fact, a large town in *one* building! The special feature of these flats is that the living-rooms in each tenement are arranged on the side of a large open quadrangle (which is used for a common garden) in such a way that every room is exposed to the direct rays of the sun some time or other of the day.

Flats are quite different from *chawls,* which are perhaps peculiar to Bombay. The latter are buildings, generally three or four storeys high, consisting of a number of separate tenements of one or two rooms, but not more than two rooms, divided by their party walls, with a common passage four feet wide, either in the front or the rear. They are provided with a few wash-houses and w. c.s, usually inadequate in number, for common use in a separate appurtenance connected by the common passage. The rooms are packed together and piled up in a very limited area, with no gardens, no separate yards, and absolutely nothing by way of privacy outside the front door of the rooms. They tend, in general, to establish a low standard in respect of comfort and decency, and thus have often a demoralising effect.

Flats, on the other hand, are separate blocks of buildings, having one or, at the most, two tenements served by one staircase. Each tenement has a complete suite of rooms, giving all the accommodation for a family to live decently and in comfort. Each block of flats has its own garden, or at least an open yard enclosed by a compound wall or a hedge.

Until a few years ago, flats were rare, even in cities like Bombay. But, little by little, people came to appreciate them, as they possess several advantages—both economical and social—over cottage homes, and today they may be found not only in the suburbs of large cities, but also in small towns. At first they were built for families of the middle class only, but there are many flats *de luxe* now, which are occupied by the well-to-do people as well.

The flats owe a good deal of their popularity to the desire on the part of people to leave the heavily rented, dingy houses built by speculative investors in congested areas as a business proposition, and to go and build their own homes on the outskirts of towns. Though the economic gain was not much in

the beginning, still, they could be independent of the unreasonable demands of their landlords, and after some time realised that the general standard of the health of their family had definitely risen as a result of the open air and cheerful surroundings. Many of the people who laid by some spare money, either in service or in business, found it a very safe and convenient investment to build a flat, part of which they could themselves occupy, and rent out the rest to people of their own status and thus, while living happily, could also earn some profits, which in the boom period after the first Great War were high.

Thus, a flat essentially possesses a business aspect to a greater or less extent. In order, therefore, that it should prove a successful investment, its planning technique must be closely observed. The following are some important considerations:

(1) That it should be designed for one class of people, keeping in mind their average income, social customs, and all other circumstances governing their mode of life.

(2) That middle class families have to keep up a certain status in society, very often beyond their means. Therefore, a flat, designed for such a class of people, should appear to be stylish and should show a high order in the workmanship and the materials employed in its construction, particularly so in the principal rooms, so that no casual observer should gain an impression that the rents are low.

(3) That tenements on the ground floor, close to the public road, should possess means, such as a high plinth, a trellis-work or a close-meshed railing in the verandahs and windows,—means which are conducive to preserve the privacy of the family from the gaze of the passers-by.

(4) That there should be an entrance vestibule, no matter if small, to every tenement, so that the visitors can wait for some time, before being ushered into the reception room.

(5) That the main entrance should form an attractive feature.

(6) That the fewer the corridors the better it is, in the interest of economy of the living space. At any rate, they should be so planned that they do not form a vista from the entrance.

(7) That when there are two tenements on the same floor, side by side, the windows of one, at least in the important rooms, should not overlook those of the other.

(8) That the supply of conveniences, such as shelves, cupboards, storage space for fuel, lines for drying clothes, etc., should be ample. The landlord should make the utmost of every available space for storage requirements. Thus, lofts can be provided over service rooms, such as the bath-room, the lavatory, the pantry, etc., where even a seven foot head-way may be sufficient.

(9) That one main staircase for one flat is preferable to one serving two flats, side by side, on the same floor. One flat served by an independent main staircase affords greater privacy and gives an idea of not being restricted by the presence of a neighbour; however, there may be neighbours in the adjoining flats on the same floor, not served by the same staircase, but by different ones.

(10) That instead of keeping several small *chowks* or court-yards open to the sky for the purpose of lighting and ventilating, all the space available should be combined to form one large *chowk*. Since small court-yards are difficult to clean, they tend to accumulate rubbish, and the windows overlooking them become merely inlets for foul gases when the rubbish rots.

(11) That if a drain has to pass under the floor of a certain part of the structure, all possible precautions, such as an extra bedfall, means of inspection and repairs, etc., should be provided to make the entire arrangement fool-proof.

(12) That the arrangement of only one flat on each floor has the advantage, like cottage homes, that each room could be arranged according to its proper orientation.

(13) That since a staircase assumes a special importance in the case of flats, the following points should be noted:

(a) It should be broad and easy to climb.

(b) It should be fire-proof. In this connection, it may be mentioned here, that an iron staircase, or a staircase in which there is a preponderance of iron, in an exposed position, is worse than useless in an emergency like fire, as it is liable to get hot—even red hot—and in that case it cannot be used.

(c) There should be preferably another staircase at the rear for servants, and this should be independent for each flat *de luxe*, since much annoyance is likely to be caused, if servants of two flats on the same floor, meet on the common staircase and converse with each other at the sacrifice of work. Such a service staircase is useful, also, as a means of emergency escape.

(d) An internal staircase, with only top light and ventilation, is very bad in high buildings. In the event of fire it behaves as a chimney shaft, at least gets full of smoke, making an escape impossible.

(e) When a staircase is at or near the entrance, it affords opportunities for the architect to make it a central architectural feature. Again, if it can be made a part of the entrance hall scheme, it produces an effect of spaciousness, which is valuable in creating a pleasant impression on the mind of the visitor.

These principles are illustrated in the following designs of flats:

TWO ROOM FLATS

PLAN NO. 8

Floor Area of three storeys: 3,150 sq. ft.

Pre-War Cost: Rs. 15,000

THIS is a plan of a building having two flats only on each floor. The staircase is at the entrance and the architect, taking advantage of it, has treated it as a central architectural feature. The entrance porch is projecting a little, over which a canopy is provided. Each flat consists of two rooms only, but unlike a *chawl,* an independent bath-room and a w. c. are provided for each. A loft is constructed on the top of the bath and w. c. at 7 ft. height above the floor. The entrance to the staircase on the ground floor, serves as the vestibule for the flats on that floor, and the upper landings, for the floors above. For the first and second floors, balconies at corners are provided which are wide enough for a person to sleep in the open air. The flats face the West, and therefore, there will be plenty of breeze in the front rooms.

As the flat contains only two rooms, it certainly does not provide the necessary amenities of life. Still, where the cost of site is very high as in Bombay, the rents also are high, which the middle class people cannot afford to pay. There are, however, hundreds of young people, recently married, starting to keep house, who very readily go in for such flats, which, except for the restricted accommodation, provide all the amenities of a decent living. These people shift to more liberal quarters upon the arrival of a baby or two, by which time their income also proportionately increases.

The building is three storeys high, and there is a terraced roof at the top, to which the same staircase gives access. All the outer walls are of brick-in-lime, 14 inches thick, and inner ones, thin partitions, 4½ inches thick, of brick in cement mortar. For supporting the beams and floor, four R. C. C. pillars are provided in the central longitudinal wall shown by thick portions of the wall.

Fig. 46

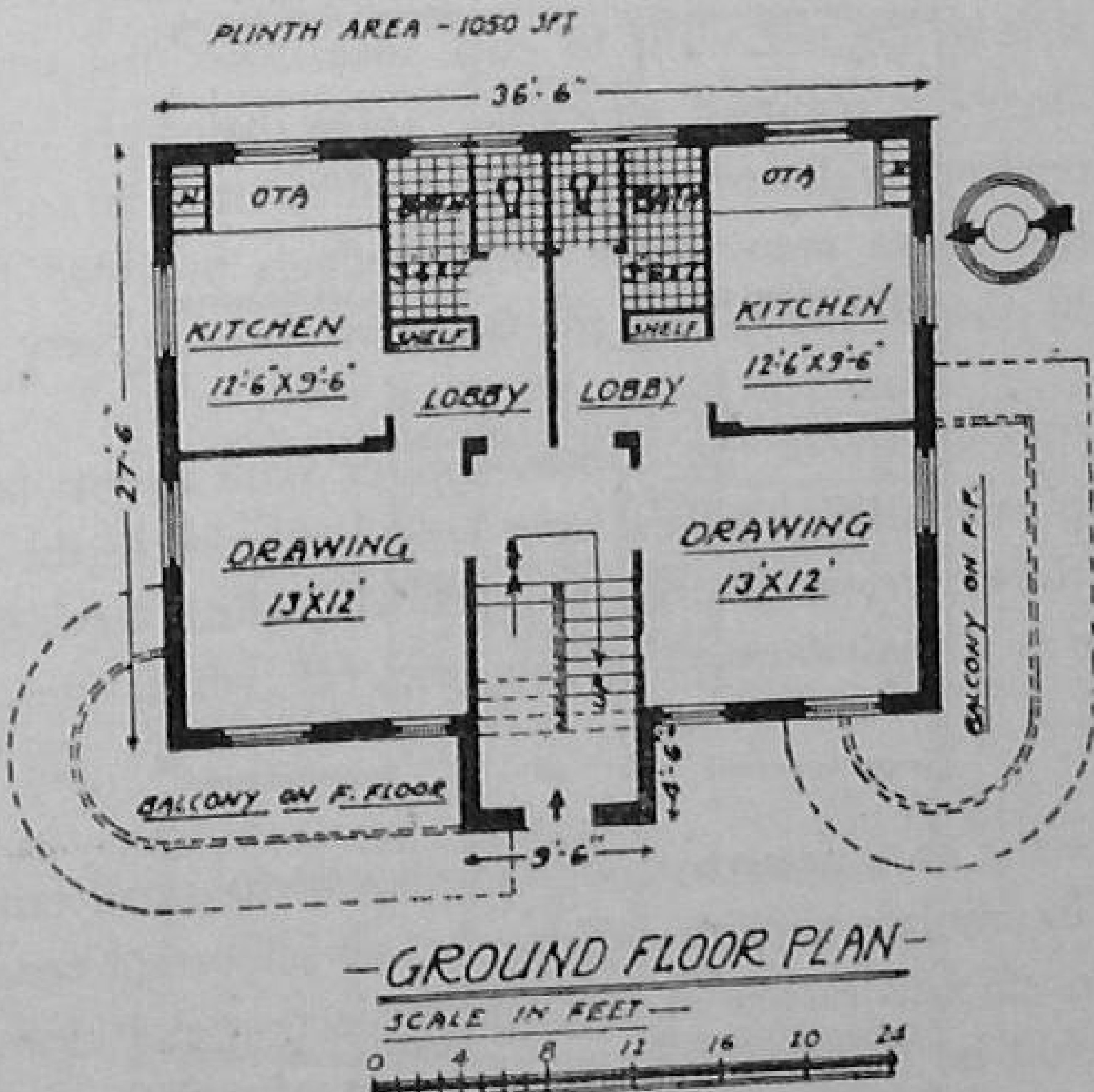


Fig. 47

Architects: MARATHE & Co., BOMBAY

PLAN NO. 9

Floor Area of three storeys: 5,430 sq. ft.

Pre-War Cost: Rs. 24,000

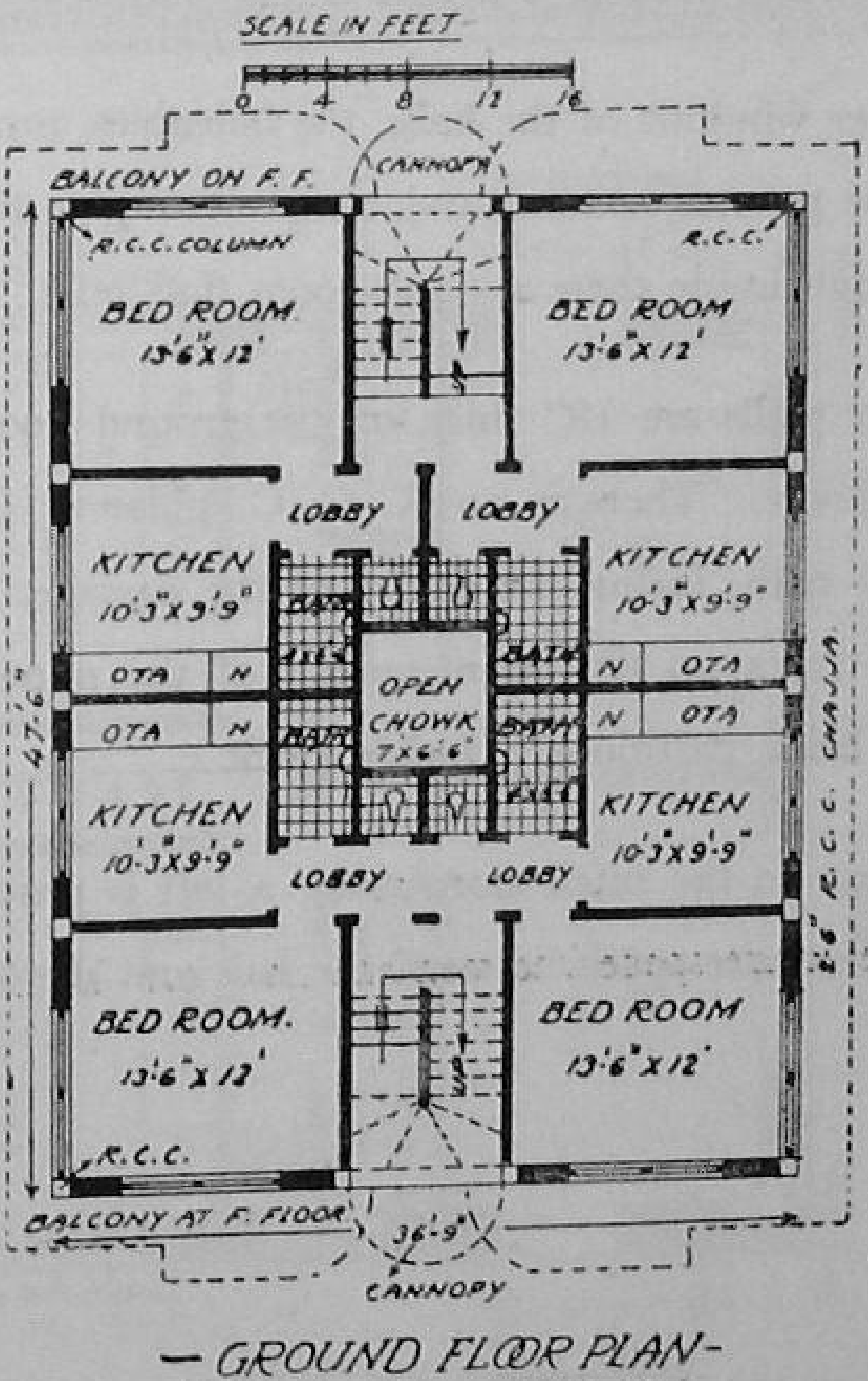
FROM the very imposing appearance of the exterior, nobody would believe that this is not a palatial building, but it is, in reality, only one having four flats on each floor, each consisting of two rooms. This building is an example of the utmost skill employed by the architects to take the maximum advantage of space in providing conveniences.

The accommodation is practically the same as that provided by the preceding plan, though the drawing hall is a bit larger. There are two entrances, one in the front, giving access to the front flats, and the other on the rear for entering the rear ones. The bath-rooms and w. c.s are arranged round a small open *chowk* or court-yard, open to the sky, so that all the drains are concentrated at one place, which is very economical. Access to the *chowk* for cleaning, is kept through one of the w. c.s on the ground floor. Though the w. c.s and baths are just in front of the entrance, they are provided with self-closing spring doors. Their height again is kept only 6′ 6″, and lofts for storage are made above them. The *ota* in the kitchen is almost like a table 2′ 6″ high with asbestos cement-lined top, below which a cupboard is formed. The whole thing is removable, so that in the event, instead of a married couple, students occupy the flat who do not want to cook their food, the same can be used as a table or may be removed altogether. The balconies provided in front of every bed-room are wide enough to afford sufficient room for a bed for sleeping out. There are so many other small gadgets provided by attending to minor details by the architects that the flats have become very popular.

The white square in the midst of outer walls shown in the plan are the R. C. C. pillars; similar pillars have been built also in the middle, and all these support the entire weight, the walls between them serving merely as partitions. There is a roof terrace at the top, to which the main staircase gives access

Perhaps the only draw-back of the plan is the small central court-yard, which might accumulate rubbish. However, no important rooms abut against it, and further, efficient means of frequent inspection and cleaning are kept in it. Still it would be better if a horizontal pipe of sufficient diameter be provided below the floor level for ventilating it, with its one end open on the street side, and the other, on the *chowk* side.

Fig. 48



— GROUND FLOOR PLAN —

Fig. 49

Architects:
ADALJA AND NOORANI,
BOMBAY.

PLAN NO. 10

Area of each floor: 961 sq. ft.

Pre-War Cost: Rs. 15,000

THE house represented by Figs. 50, 51 consists of two-room flats, two on either side of the staircase on each floor. The entrance to the ground-floor flats is either from the steps on the sides of the hall or from below the staircase through the passage. Only two flats on one side of the staircase are shown in the plan. The close proximity of w. c.s to the kitchen may not be liked by some people, but if there is a water-flushing system available there is no objection. A small bath-room and a store-room are also provided at convenient places. The kitchen is pretty large to serve both as a kitchen and dining-room.

Two large balconies are provided on the upper floors, projecting from the living-rooms. The kitchen is provided with a very large window. The store-room is likely to be a little dark, but if the wall surface of the kitchen opposite to it is white-washed, it would reflect sufficient light into it.

The corner windows of the halls, the balconies, projecting canopies over windows, and the general architectural composition give the building a palatial appearance, though inside there are two-room flats only.

The outer walls are 18″ thick on the ground floor, and 14″ thick for the two upper floors. There is an R. C. C. pillar at the end of the wall dividing the two halls, facing the centre of the passage, which, together with the outer walls, takes up the entire weight of the upper structure. All the inner walls are brick partitions 6 inches thick.

In addition to the small store-room, a loft is provided at 6′ 6″ height on the top of the entire space between the hall and the kitchen.

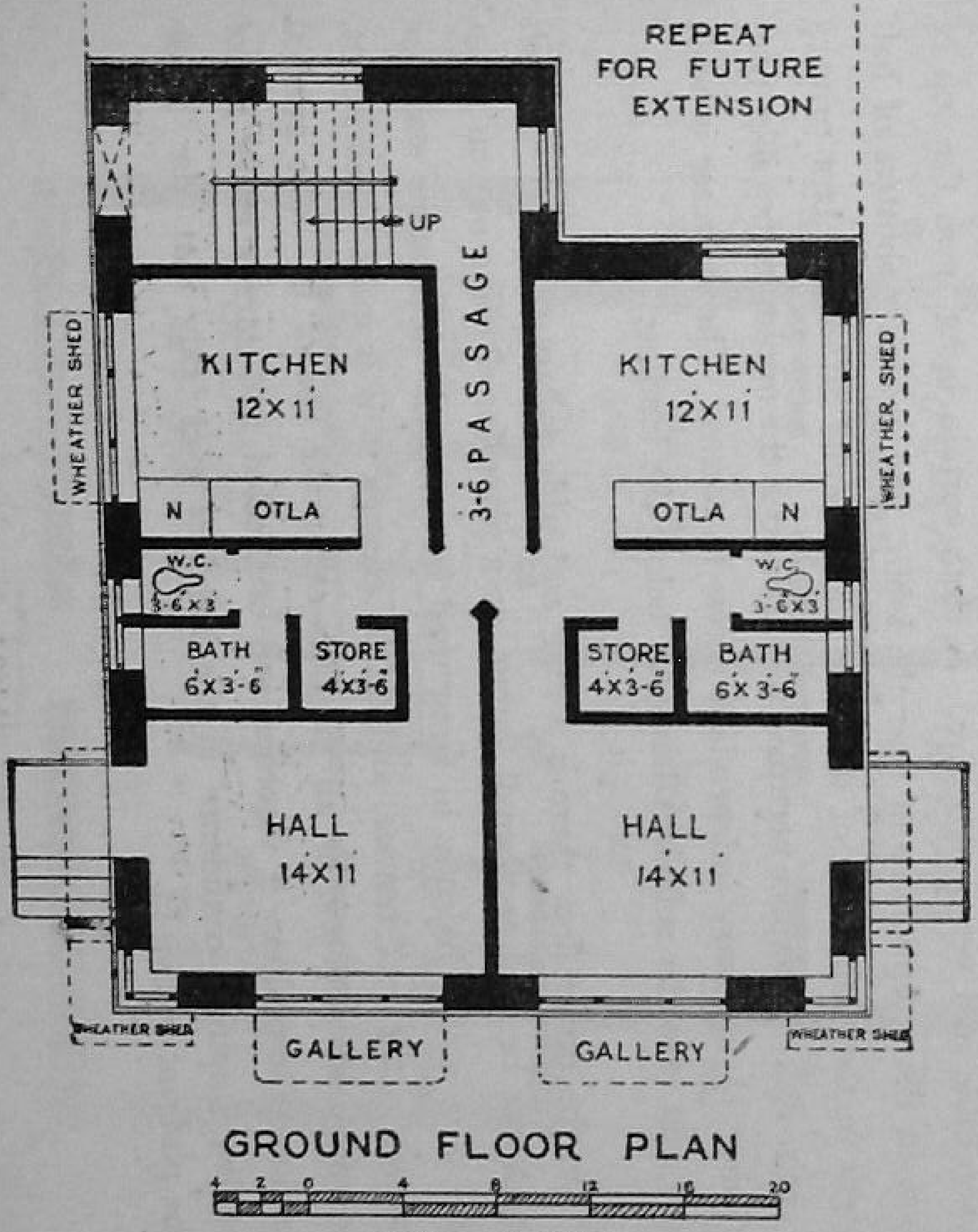


Fig. 51

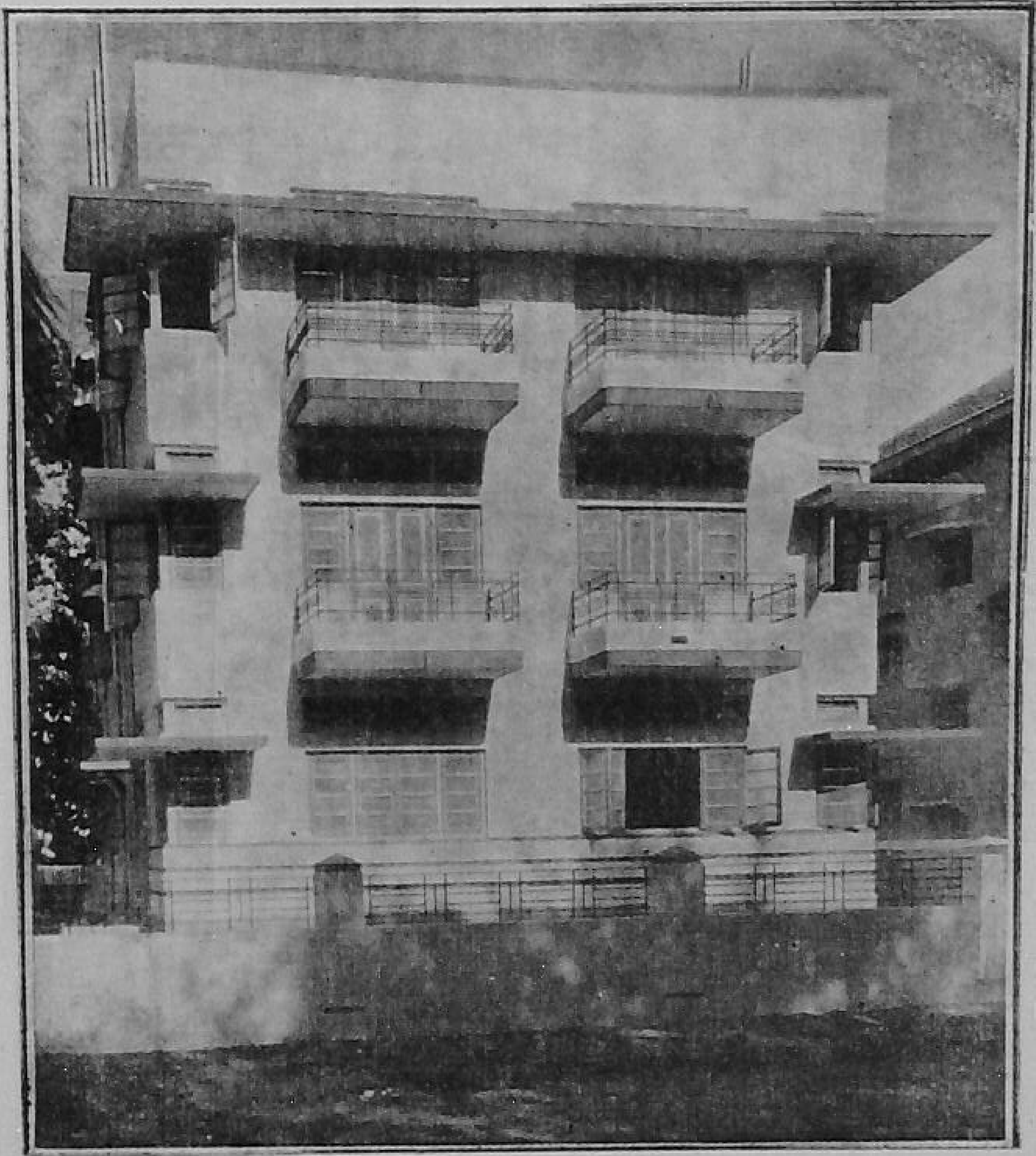


Fig. 50

Architects: M/S Kamtekar and Bhivandikar.
Contractor: Mr. M. V. Nayak, Bombay.

PLAN NO. 11

Floor Area: 2,986 sq. ft.

Pre-War Cost: Rs. 12,250

The plan on the opposite page represents a design of a very convenient building containing three-room flats. It occupies a space of approximately 42 ft. × 35 ft., or roughly, 1,450 sq. ft. of ground, within which decent living accommodation for two families has been provided. All the three rooms are of equal size, and as their shape is oblong, they are more useful than if they were square. Thus, the kitchen can normally provide the necessary space for a few seats for dining, which the lady finds very convenient, particularly when the school children are having their hurried meals which she can serve and, at the same time, give some finishing touches to a few dishes. There is plenty of light and ventilation in every room. The reception room in the front which is, in fact, the show-room of the family, is treated particularly well with the front and corner windows and the overhanging canopy over them, so that, if the workmanship and the materials used in construction are as good as the design, the flat, even though of three rooms, would create an impression of stylish living by the family. The bath and w. c. have received the best position—easily accessible and yet unobtrusive. A cloth curtain hung from the top of the door, in the reception room near the lobby, and swinging shutters of half the height in the main door of the same room, would afford the best privacy in the entire flat. The space occupied by corridors is the minimum possible, consistent with the necessary independent access to rooms. The staircase is wide and easy and provides sufficient headway below the landing.

On the upper floor there is a long and wide gallery provided for each flat which can be used as a small lounge, or a place for sleeping out on a hot or sultry day, and a balcony in front used in common. The same staircase gives access to the roof terrace, and as the passage to it is quite independent, the occupants of any one or all the flats can make use of it. The general architectural composition is vigorous and unaffected and carries every air of domesticity, inspiring confidence in the mind of everybody that the house must be pleasant to live in.

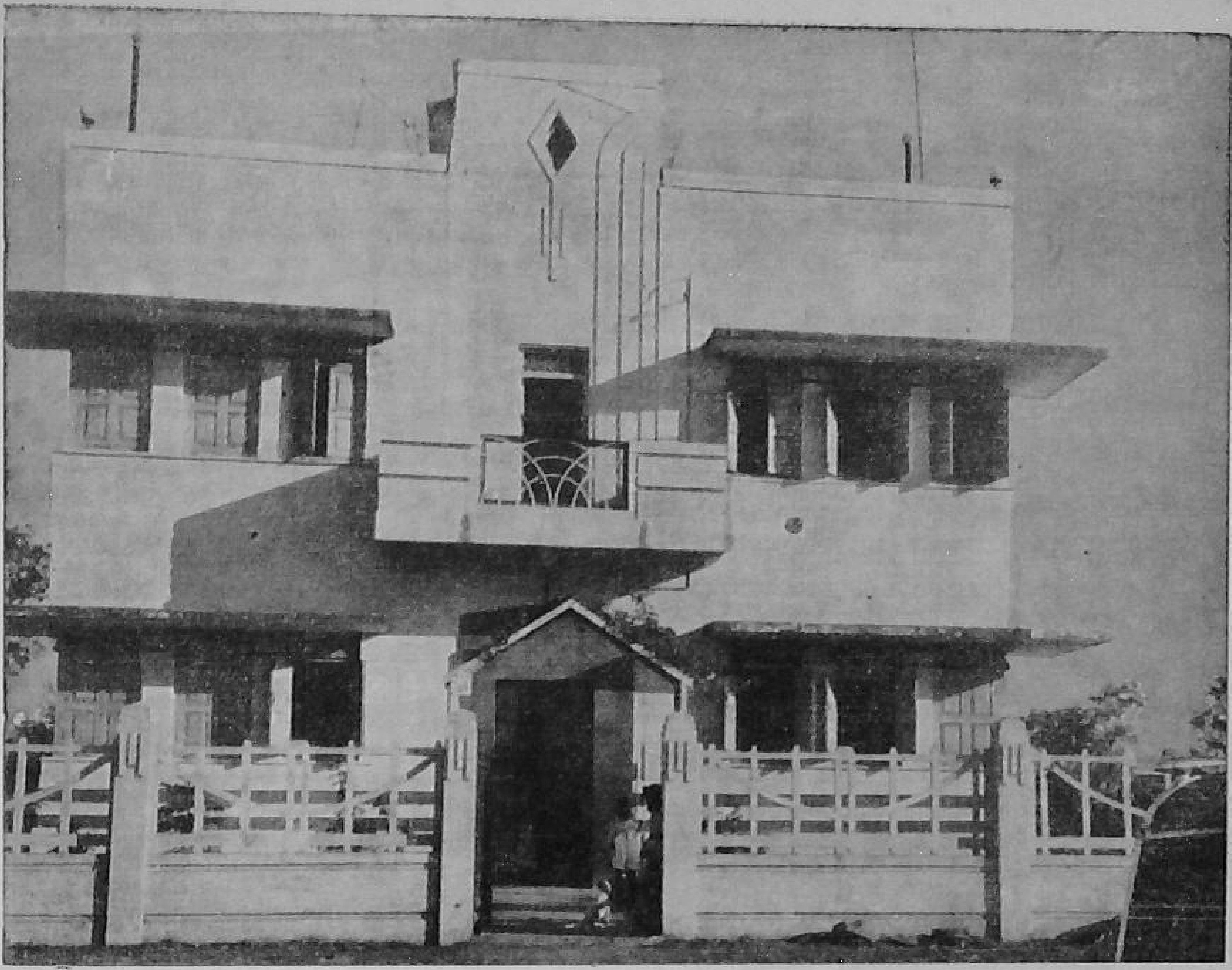
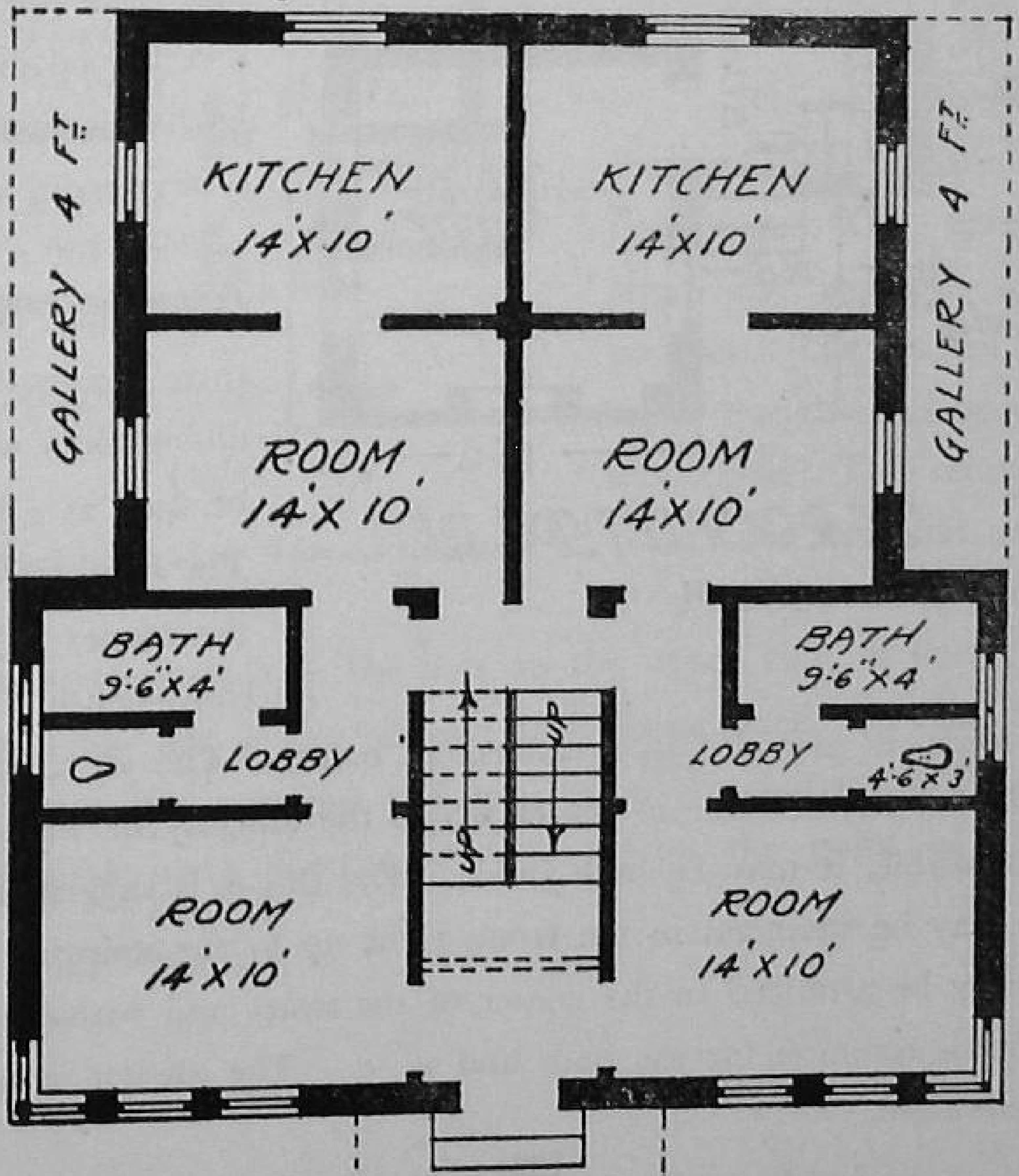


Fig. 52



Architect: PROF. N. S. GUPCHUP.

Fig. 53

PLAN NO. 12

Floor Area of each storey: 694 sq. ft.

Pre-War Cost: Rs. 2,750

THIS plan represents a very compact design of a 3½-room flat. It occupies a plinth area of less than 700 sq. ft. and yet provides all the necessary decent accommodation for a small family. As the entrance to the staircase is quite outside and independent, it admits of several storeys being built with an independent flat on each floor, or if a family requires more accommodation, two or more floors can be occupied by it. In the latter event, a small staircase on the rear side, no matter even if it is exposed, would add much to the convenience.

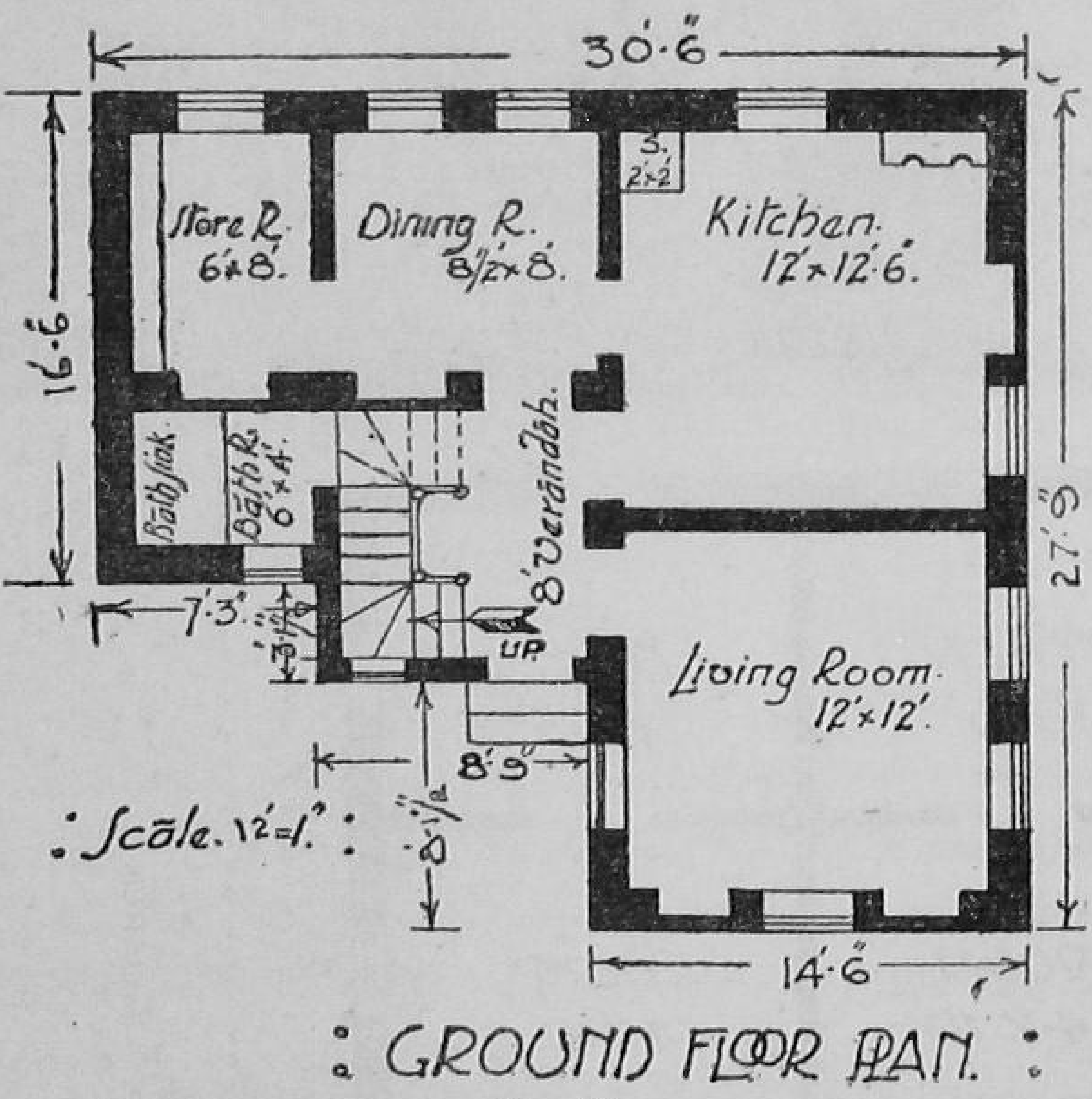


Fig. 54

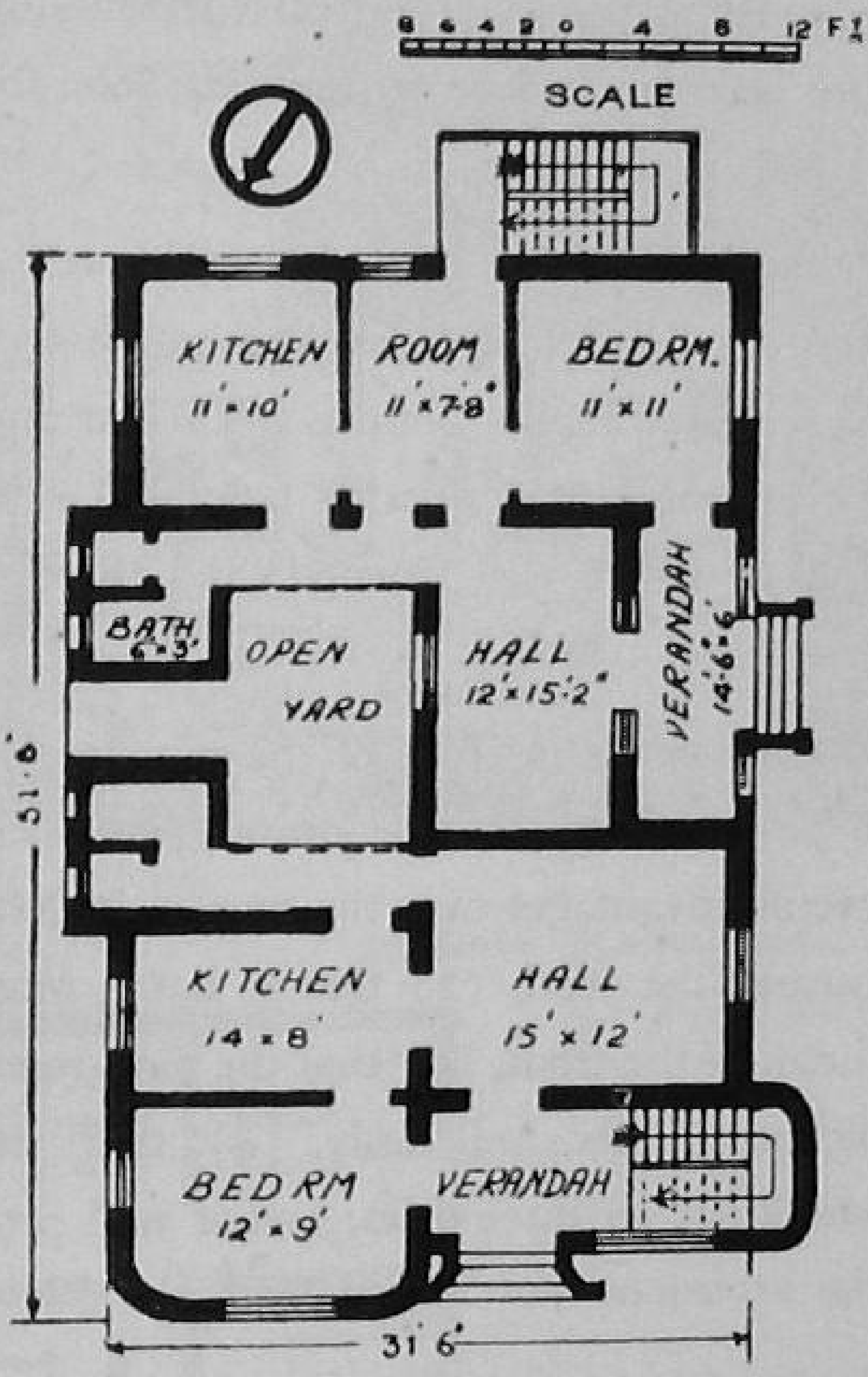
There is just a small vestibule in the front which serves also as a landing to the staircase. The living-room, with light and ventilation from three sides, is a very good room. The kitchen is comparatively a large room and would provide for a few seats for dining also. Still, there is a small separate dining-room which may be used as a bed-room. The small store-room in the corner is a great convenience. A separate bath-room is provided in a convenient corner. The w. c. is not provided inside the house. But in places where the amenity of water carriage system is available, it may be built inside. For this it is suggested that the bath-room may be extended in the front, right up to the staircase wall, and the w. c. may be arranged in the corner of the store- and bath-room with a lobby in front, common for the bath and w. c. The design admits of a beautiful elevation.

PLAN NO. 13

Floor Area of two storeys: 3,430 sq. ft.

Pre-War Cost: Rs. 13,500

THE flats represented by the marginal plan, have the different rooms very skilfully arranged. The arrangement of lighting and ventilating the rooms is made both from the outside, and also inside from a small court-yard or *chowk* open to the sky. The bath-room and w. c. are both arranged inside the flat with very convenient, independent access provided to them. Still, in respect of privacy, the flats in the previous plan are infinitely superior.



GROUND FLOOR PLAN.

Fig. 55

Architects: ADALJA & NOORANI, BOMBAY.

The sizes of rooms in these flats are better than those in the preceding. The drawing-hall is large and occupies a prominent position. The kitchen, an oblong room, though small, would be more serviceable. The verandah, in the case of the front flat, serves just as a vestibule, because there is a common passage through it to the flats on the upper floor or floors; but in the case of the rear flat, it can be used as a sitting place. In fact, the rear flat is more convenient, spacious and private, as the staircase is on the outside. It would prove more comfortable, also, from the point of view of the orientation.

PLAN NO. 14

Floor Area: 3,298 sq. ft.

Pre-War Cost: Rs. 15,100

THIS is another clever design of three-room flats. The requirements of the building were that the landlord wanted to provide for two tenements on the ground floor and reserve the entire accommodation on the first floor for his own family.

The entrance to the left-hand tenement on the ground floor is on the left-hand side, directly opening into the drawing-room. The kitchen, though square in shape, is a spacious room to serve, normally, both as a kitchen and a dining-room. Every living-room in this tenement derives its light and ventilation from two sides. The bath and w. c. are well situated, and there is absolutely no space wasted in unnecessary, long lobbies.

The entrance to the right-hand tenement is in front of the middle row of rooms, and opens through a small porch either into the drawing-room or bed-room. This tenement possesses several advantages over the one on its left, viz., (1) that it is in the front and nearer the road, (2) that it has a most delightful 7 ft. wide semi-circular verandah in the front, (3) that the bath-room and w. c. are in a secluded, inconspicuous corner, and lastly, (4) that the drawing-room is open to light and ventilation on three sides, and is well protected by the deep verandah from the afternoon hot breeze from the West.

The staircase on the back of the front row of rooms with some winding steps, gives an entrance into the drawing-room on the first floor. Two bed-rooms with a common bath and w. c. between them, are provided on the top of the left-hand row of rooms, the middle row is utilised for a kitchen, dining-room and a drawing-room, and in the right-hand row there is a bed-room with a terrace in front, balcony on the left side, and a bath and w. c. behind. This room would prove very good as a guest room. The roof over the terrace in front of this room is overhanging for the most part, which is a bold feature. Similarly, the 4′ 6″ balcony projecting beyond the front corner of the bed-room in the left-hand row also gives a boldness to the architecture.

The same staircase is continued to give access to the terrace and the few rooms on it. The area of the two floors is 3,298 sq. ft.

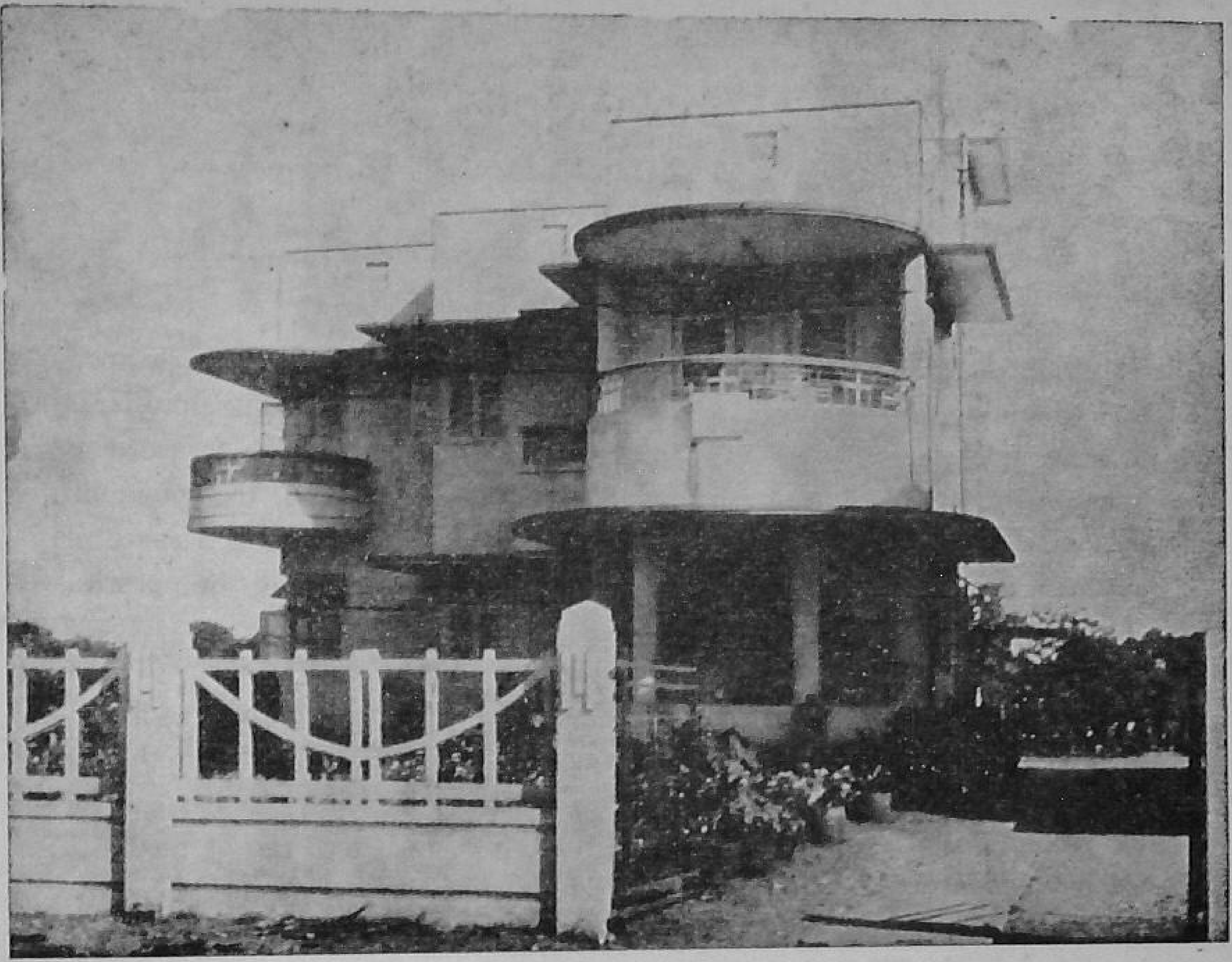


Fig. 56

Architects: Master, Sathe, & Bhuta, Bombay.

Fig. 57

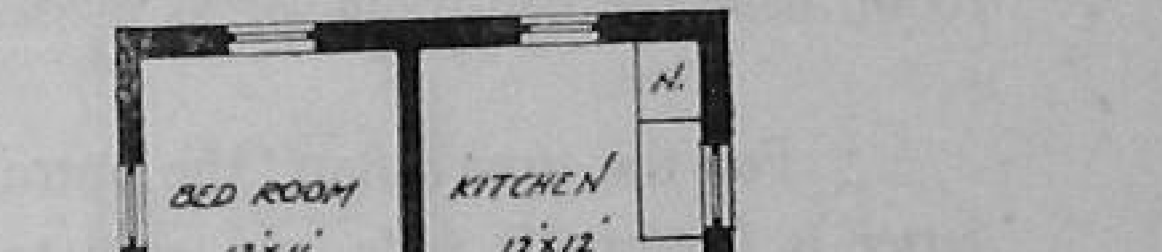


Fig. 58

PLAN NO. 15

Floor Area of three storeys: 5,718 sq. ft.

Pre-War Cost: Rs. 25,250

THE charming building pictured here provides two flats on each floor, each consisting of 3½ rooms, since the lobby in the front is sufficiently large to serve as a store-room at least; if suitably enclosed it may be regarded as a half room. According to the Bombay Municipal bye-laws, the minimum area of a room must be 100 sq. ft. and, therefore, when there is a space of less area, it is classed under a lobby though, in fact, it serves all the purposes of a small room.

In this plan, the entrances to the ground floor flats open into the living- or drawing-rooms; on one side of the latter is a kitchen and on the other, a bed-room. All these rooms are spacious enough; the lobby, in the case of the ground floor flats, serves as an excellent ante-room, which can be used as a tea room or a dining-room also. There is a partition between the lobby and the bath and w. c. behind, with a self-closing, swinging spring door, shown by dotted lines. There is a further amenity of a small useful space between the bed-room and the staircase, which may be used either as a second bath-room, near the bed-room, or as a fuel or store-room or even as a prayer-room.

For the upper flats, the entrance is, of course, from the staircase; the latter is fire-proof, wide and easy to climb. The staircase may be arranged in either of two ways: (a) to start climbing the left-hand flight just in front of the entrance and land on the upper floor in the balcony and enter the flat through the space between the bed-room and the staircase (shown bath-room in the plan). This has the advantage that the lobby can be used as a perfect ante-room; or (b) to go below one of the flights, turn to face the entrance door and start climbing the other flight, to land in front of the lobby. In this arrangement, the lobby loses its privacy as an ante-room, but the space between the bed-room and staircase can be fully utilised.

The landlord who occupies the entire second floor has made one large lounge out of the two lobbies by removing the partition. There are, besides, spacious balconies provided on all four sides. The cupboards on either side in the wall between the hall and bed-room are decorative features and serve as excellent clothes closets. The same staircase leads to the deck roof on which galvanised pipe framework is erected (seen in the photograph) for drying clothes or even for hanging mosquito curtains to sleep under.

Fig. 59

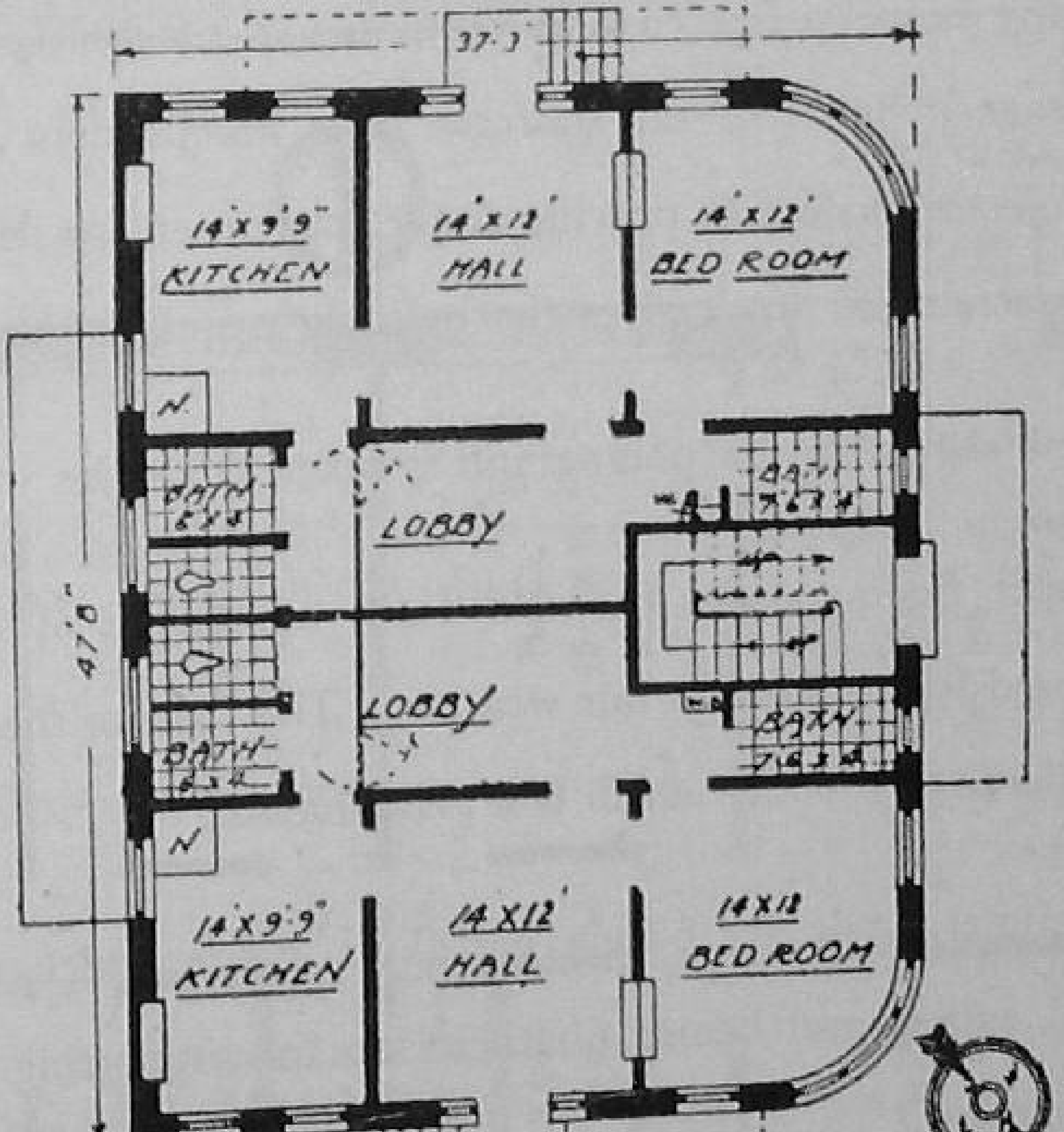

37'-3"
47'-6"
14'X 9'-9"
KITCHEN
14'X 12'
HALL
14'X 12'
BED ROOM
N
BATH
LOBBY
LOBBY
BATH
N
14'X 9'-9"
KITCHEN
14 X 12'
HALL
14 X 12
BED ROOM
-GROUND FLOOR PLAN-
SCALE IN FEET-
0 4 8 12 16 20 24

Fig. 60

PLAN NO. 16

Area of three floors: 5,340 sq. ft

Pre-War Cost: Rs. 23,500

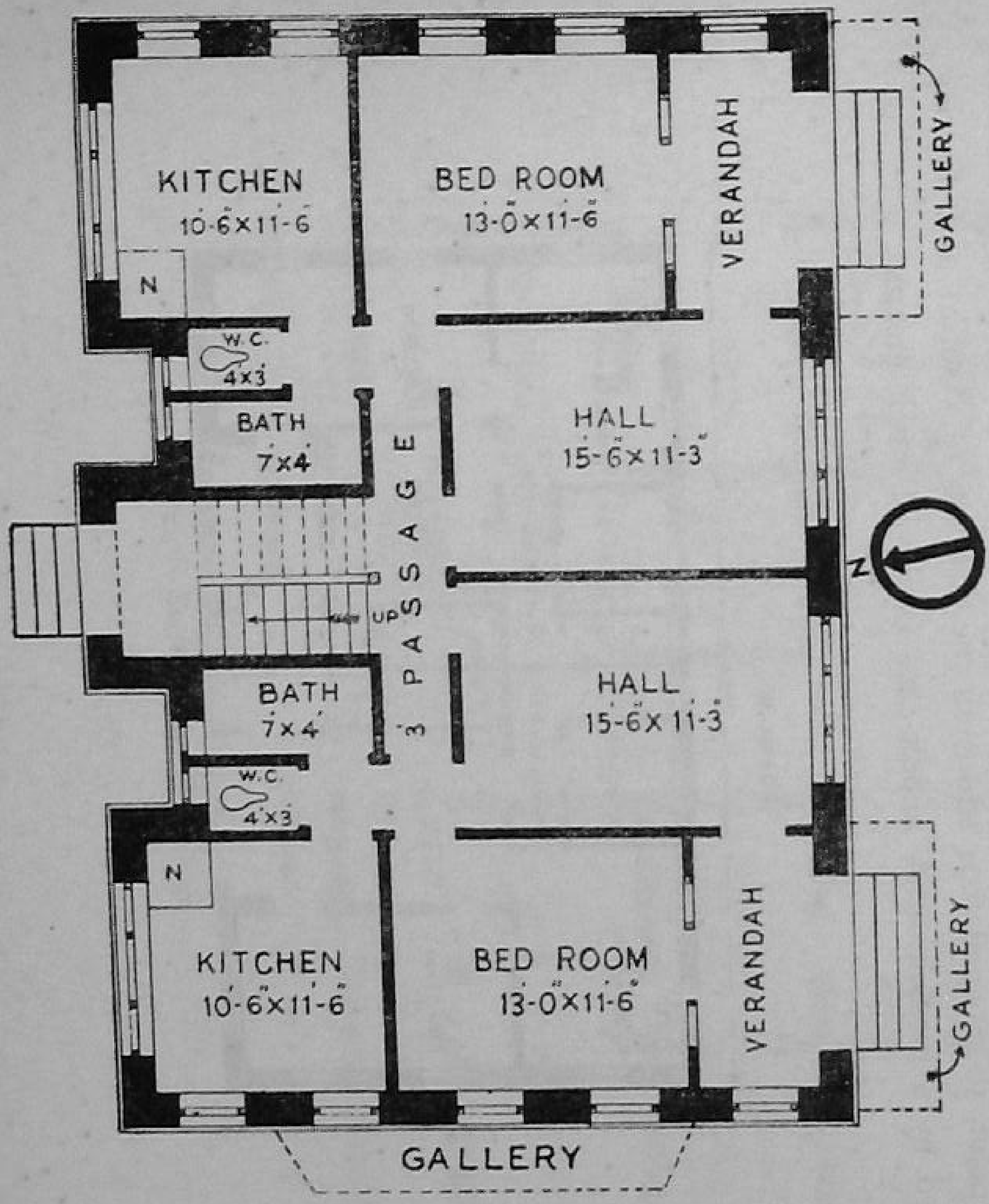
THE plan represented by Figs. 61, 62 consists of flats of 3½ rooms including a kitchen and a six feet wide verandah. For the ground floor flats, the front entrance is from the right-hand side to the verandahs, and the back entrance is at the centre of the building on the left-hand side below the staircase. For the upper floors there is only one entrance through the R. C. C. fire-proof staircase. The sizes of all the rooms are very good. There is a bath-room and w. c. provided on either side of the staircase in a convenient corner, easily and independently accessible from any room. Above the whole block of the bath and w. c., a loft is provided at 6′ 6″ height to serve as a store-room, which can be reached by a portable ladder from the kitchen.

The entire house is lighted and ventilated in the best possible manner. The small passage in front of the staircase gives independent access to every room. The projecting balconies provide ample space even for sleeping outdoors. The delicate concrete *jali* work gives the building exquisite charm.

The view shown in the photograph is taken from the west side.

The upper floors possess the additional advantage of large balconies which can be used for sleeping in fair weather. The flats on the west side have also a large gallery, 4 ft. wide, which is a great blessing.

All the inner walls are 6-inch partitions, inside which are hidden 6″ by 6″ R. C. C. pillars and beams on their top for supporting the weight of the upper structure.



GROUND FLOOR PLAN

SCALE IN FEET

Fig. 62

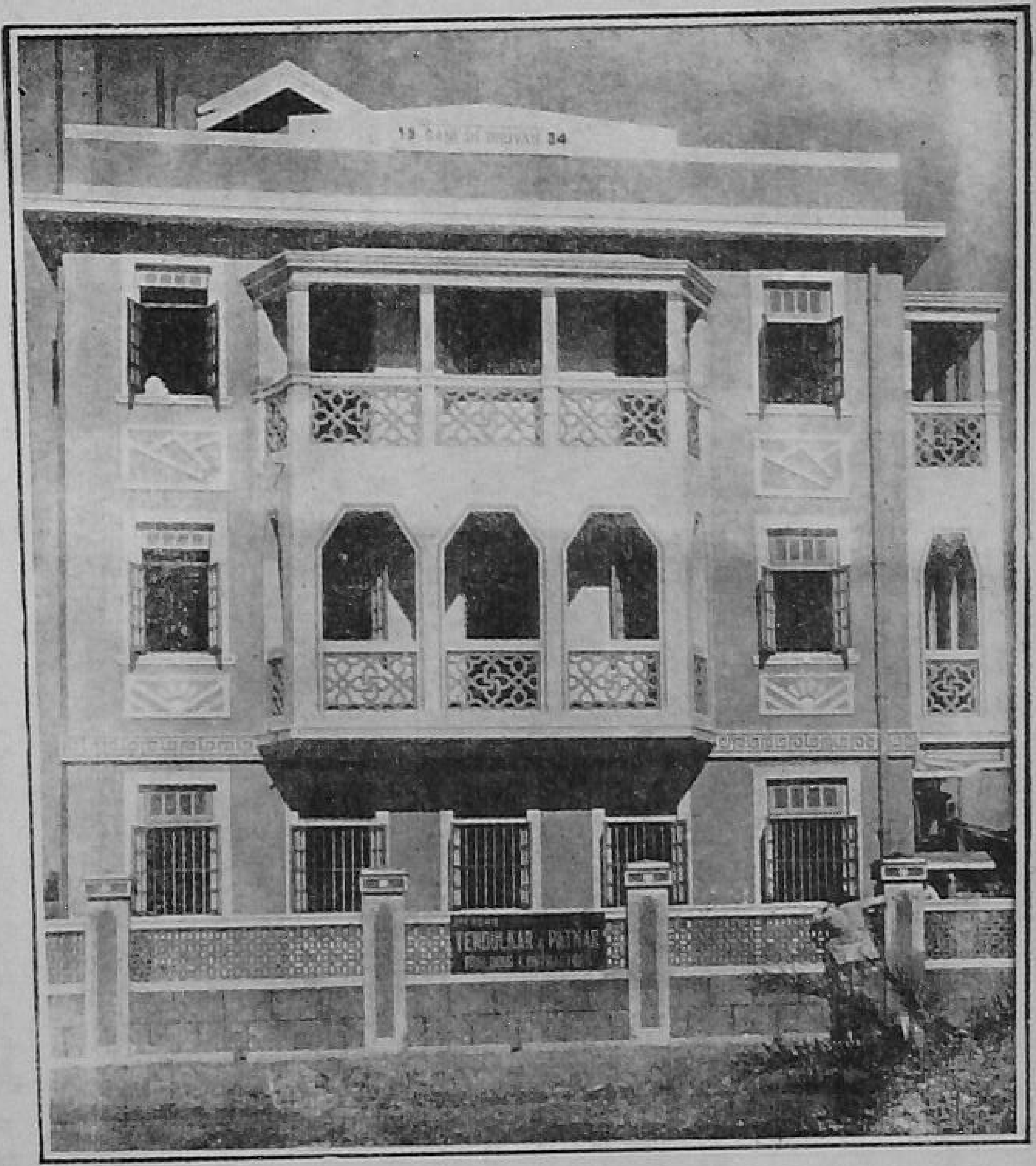


Fig. 61

Architects: M/S Kamtekar and Bhivandikar, Bombay.

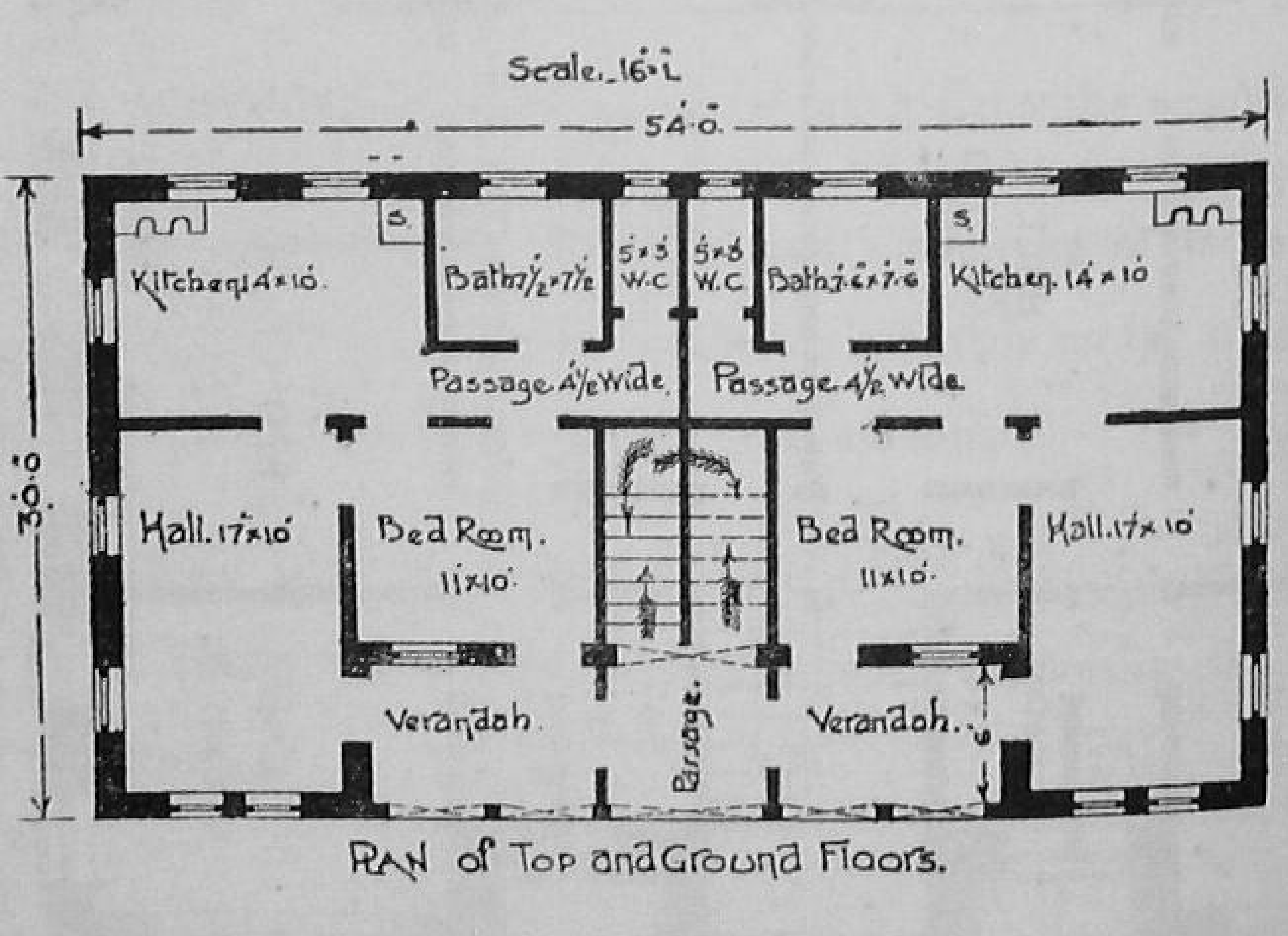
Contractors: M/S Tendulkar and Patkar, Bombay.

PLAN NO. 17

Floor Area of two storeys: 3,240 sq. ft.

Pre-War Cost: Rs. 12,860

THE plan pictured below represents a very compact design of three-room flats. It provides, in a small space, all the necessary living accommodation required by a middle-class family. The main entrances to the flats are on the right and left-hand sides of the entrance passage through doors, which, if normally closed, would preserve the privacy of the flats from the occupants of other tenements. Though each individual tenement occupies an area of less than 750 sq. ft., all the necessary accommodation has been provided for, in a small space. The kitchen is oblong and is spacious enough to serve also as a dining-room. A loft over the bath-room and w. c. would serve as a store-room. The space below the staircase would be useful for storing coal or fuel. The passage behind the bed-room gives an independent access from any room to the bath and w. c. There is just a small verandah in front to serve as a waiting place for visitors or also as a sitting-out place for the members of the family. The verandahs on the upper floors would be more enjoyable since, being at a higher level, they would be more private. Thus, considered from every point, these small flats afford all the elements of comfort and decency required by a medium-sized, middle-class family of small means.



PLAN of Top and Ground Floors.

Fig. 63

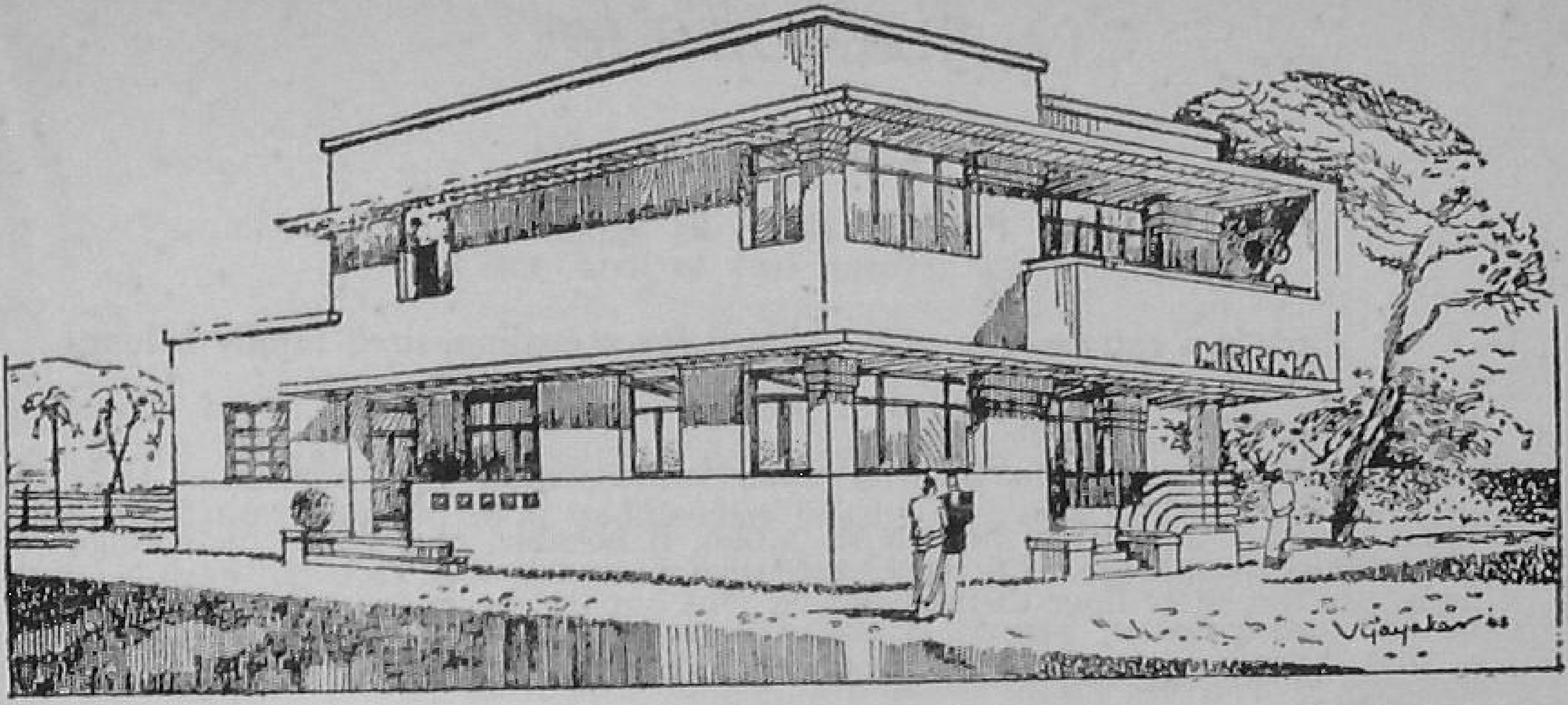


Fig. 64

Figs. 65 and 66

PLAN NO. 18

Plinth Area: 970 sq. ft.

Pre-War Cost: Rs. 8,000

THIS is a cottage that was designed for a medium-sized family belonging to the lower middle class with slender means who had saved about Rs. 5,000 and wanted to build a small home within that amount. They were, however, advised to borrow Rs. 3,000, if possible, and build this cottage floor, use the latter floor themselves and rent out the lower to a family of one so that they could improvise a temporary kitchen on the terrace on the upper of their friends or relations for a few years, until they repaid their loan. They did this in 1942, and have been able to pay off the loan out of almost the rent recovered from the ground floor, and are now very happy.

The rooms on the ground floor are no doubt small, but what a family of this class of society wants is more rooms though small, rather than a few larger ones. Again, clever planning allows for rooms to be used for more than one purpose. Thus the sitting-room could also be used as a bed-room; by removing the curtain between the drawing- and sitting-rooms, a large hall could be formed for use on special festive occasions; the bed-room could be used as a dining-room when a guest is to be entertained, and so on.

The plan is self-explanatory. The bath-room, w. c., and water pipe corner are at very convenient places. The window in the wall between the staircase and bed-room is near the ceiling for reasons of privacy, and is meant mostly for ventilation rather than for light. The staircase, though winding for the sake of economy, is full 3 ft. 9 in. wide and can be approached from the outside if the two floors are to be used by different families.

The upper floor has several special features which make it spacious. For instance, the sitting-room is extended 5 ft. by giving it a support of an isolated column from below. The 4 ft. wide verandah on the ground floor is converted into a gallery 6 ft. wide, so that it could be used even for sleeping, the bed-room on the ground floor is extended up to the outer wall to make it a spacious room, and so on. If the family were prepared to spend a thousand rupees more, it would be possible to form an excellent terraced roof for sleeping on summer nights, with the staircase raised to lead to it.

FOUR-ROOM FLATS

PLAN NO. 19

Floor Area of two storeys: 4,475 sq. ft.

Pre-War Cost: Rs. 18,850

THIS is a very compact design of flats, in which the minimum accommodation required by a middle-class family, viz., of a kitchen, two bed-rooms, a drawing-room and a verandah, is provided. The drawing-room is quite an independent room, so that even if outsiders occupy it, the privacy of other rooms will not be disturbed. There is a smoke-outlet provided by projecting a part of the kitchen at the back. If light partitions be erected across the front and rear verandahs, in line with the outer lines of the wall of the drawing-room, with self-closing shutters hung by means of springed hinges, the front verandah would become a useful sitting-room and the rear one, a small dining-room for occasional use. There are projecting balconies provided in front of windows on the front side and a cantilever gallery on the west side on the upper floor. The w. c.s are placed just outside the building abutting against the bath-rooms.

The kitchen and both the bed-rooms are all of the same size and their oblong shape makes them very serviceable. Wall cupboards are provided in the space below windows. Thus the flats supply all the needs of a fairly large middle-class family.

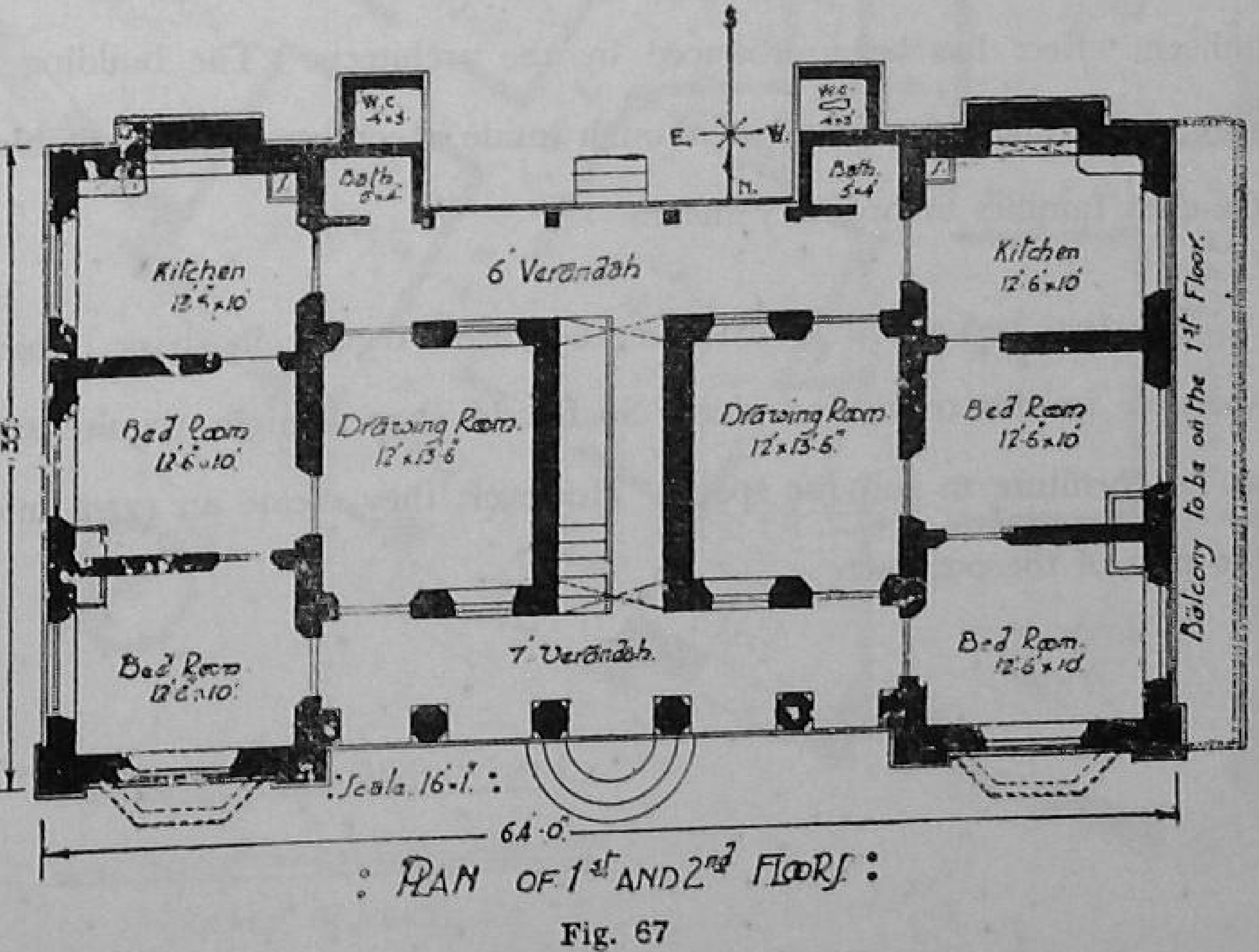


Fig. 67

PLAN NO. 20

Area of three floors: 5,580 sq. ft.

Pre-War Cost: Rs. 24,750

THE design shown in Figs. 68, 69 consists of two flats on each floor. The one on the left-hand side is slightly bigger and has four rooms and an entrance verandah. That on the right-hand side has only three rooms and a verandah. The bath-room and w. c.s are very skilfully placed, so that not only do they occupy easily accessible positions, but their grouping, side by side, affects a considerable saving in the length of the drain and also sanitary fittings. The staircase is also very cleverly located in a compact triangular space. The odd and irregular-shaped spaces have been utilised for cupboards.

In the left-hand flat, there is a dining-room, the same is necessary as the kitchen is small. In the flat on the right-hand side, there is no separate dining-room as the kitchen is bigger.

The site is triangular in shape. Houses on such plots require very careful consideration from the architectural point of view. In the present case a magnificent effect has been produced by the architects. The building presents an appearance of a mansion, though inside it consists of flats suitable for middle-class families of ordinary means.

The two bed-rooms at extreme ends are irregular in shape, which is unavoidable in the triangular plot. Such odd shapes might require special design of furniture to suit the space. However, they create an extra interest on the part of the occupier.

Fig. 68

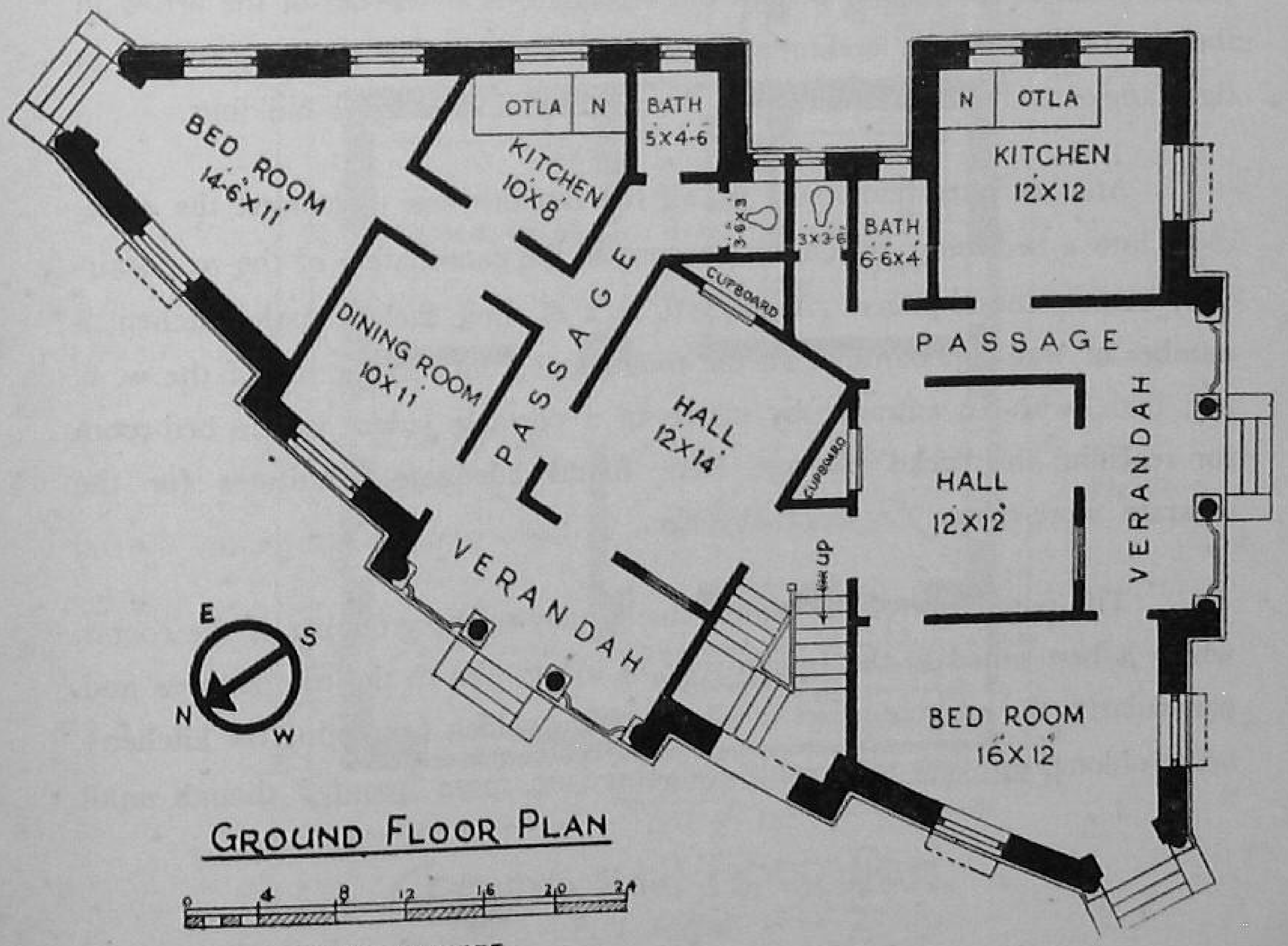


Fig. 69

Architects: M/S KAMTEKAR AND BHIVANDIKAR, BOMBAY.
Contractors: M/S S. D. PRABHAVALKAR AND CO., BOMBAY.

PLAN NO. 21

Floor Area of two storeys: 1,924 sq. ft.

Pre-War Cost· Rs. 8,000

THE plan of these flats is taken from my *Residential Buildings Suited to India.* This is one of the most popular plans with medium-sized middle-class families, and so far as I am aware, no less than ten buildings have been erected on the scheme of this plan with slight alterations in different places. The alterations made are very interesting as they indicate the general trend of this class of people. In all the ten cases, the rear staircase has been altogether omitted. An improvement also has been effected in all the cases in the arrangement shown in the plan, viz., the w. c. first and bath afterwards. In some houses, the positions of these are reversed, a small through lobby being provided to reach the w. c., while in others, the w. c. is located as it is, but it is made to face the left-hand side. The third alteration made by some families is to shift the main staircase from the verandah and put it just outside the building in two flights, at right angles to each other. The first flight starts just in front of the second post in the verandah, near the tail of the arrow in the plan, with a square landing at the corner, the other flight starting from it at right angles and running parallel to the right-hand side of the building.

Another alteration made by all the families was to convert the store-room into a bed-room, which, on account of the cancellation of the rear staircase, became much larger. A godown, rack of three shelves in the kitchen, a number of wall-cupboards in all the rooms and a loft on the top of the w. c. and bath, with an entrance by means of a portable ladder in the bed-room for reaching the "dead" storage, were found adequate substitutes for the separate store-room.

The popularity of the plan is due largely to the grouping of the rooms, which is best suited to the Indian style of living, also to the compactness and, particularly, the adequate sizes of all the rooms, which (excepting the kitchen), being oblong, are very serviceable and, therefore, more "roomy," though small.

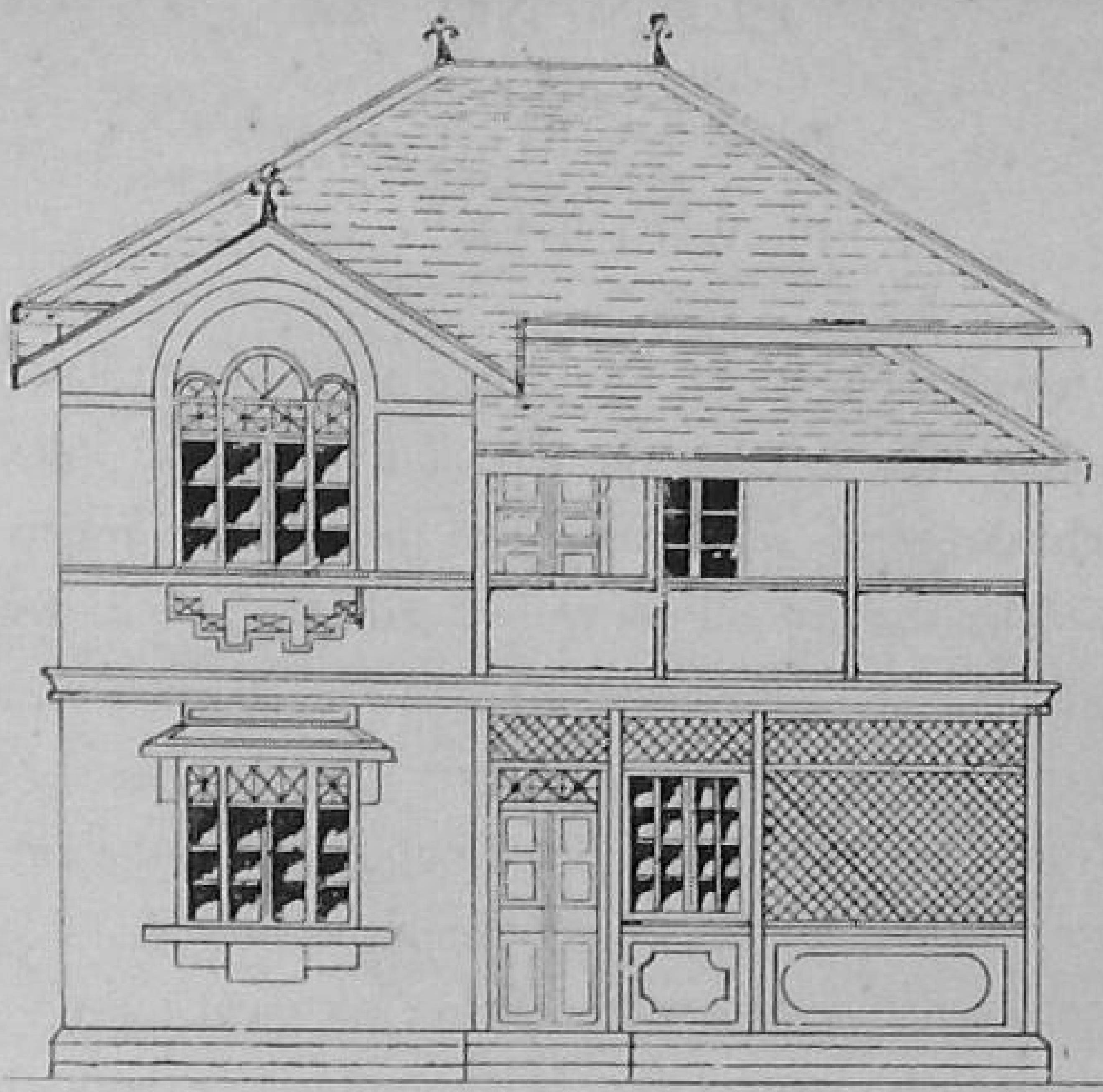


Fig. 70

: FRONT ELEVATION. :

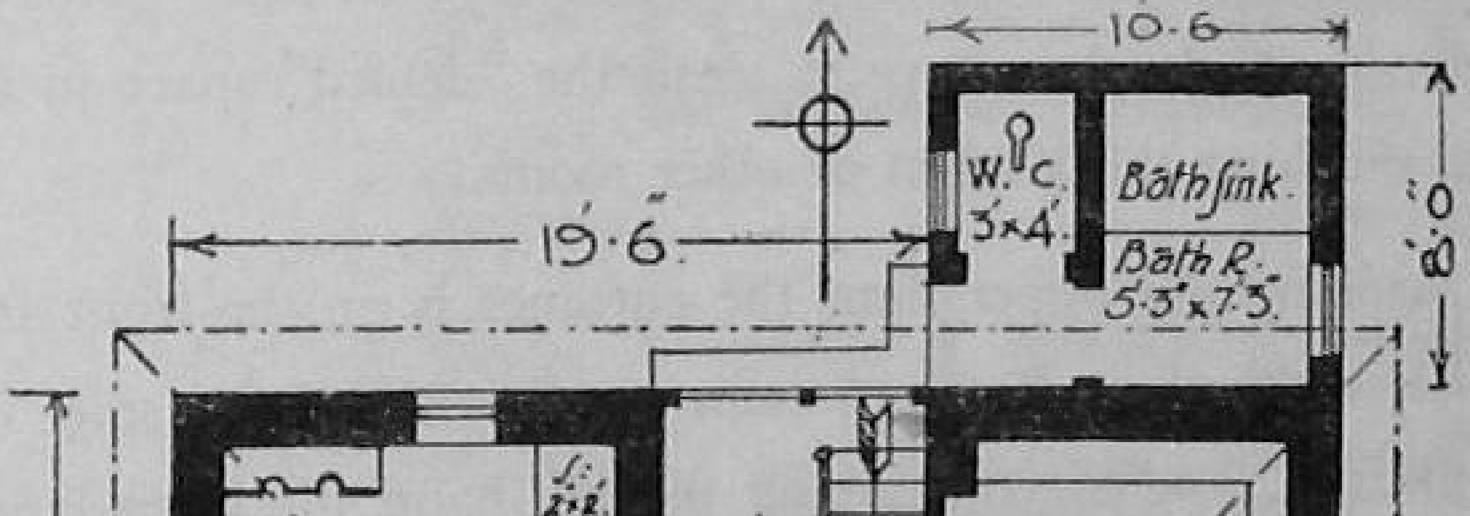


Fig. 71

: GROUND & 1St FLOOR PLAN. :

: Scale. 12'=1" :

PLAN NO. 22

Floor Area: 4,616 sq. ft.

Pre-War Cost: Rs. 19,000

THIS is a well thought out, nice design of four-room flats. The entrance to the ground-floor flats is from the left and right-hand sides into a long verandah, which also serves as a passage to the different rooms and also as a waiting place. The sizes of all the rooms are good, and their grouping in every flat is excellent and very economical. The space between the kitchen and bed-room, in front of the passage, is very cleverly utilised in forming cupboards on all four sides; particularly those cupboards in the kitchens and bedrooms which are spacious, would be very highly appreciated. A store-room is arranged very conveniently in a corner, close to the kitchen, and the bath and w. c. are given such quarters that, being unobtrusive, both afford the greatest privacy and are independently accessible from every room. Perhaps the sentiments of some orthodox people might revolt when, after "purifying" themselves by taking a bath, they have to tread the "defiled" space in front of the w. c., before reaching the kitchen or other rooms.

For reaching the upper flats, the entrance is on the front side and one has to go below the short flight of stairs on the right-hand side, face toward the main entrance, and start climbing the left-hand flight, to land finally in front of the drawing-room on the right-hand side. The verandahs, in the case of upper flats, serve as excellent balconies which can be used also for sleeping out as they are sufficiently wide. There are, besides, round balconies projecting from corners of drawing-rooms. These are not shown in the plan but can be seen in the photograph. These lend a charm and heighten the effect of the elevation. The same staircase leads independently to the terraced roof, which can be used in common by the people of either flat as the passage to it is independent.

A nice design, indeed, which provides in a small, compact space most of the facilities of a cottage home.

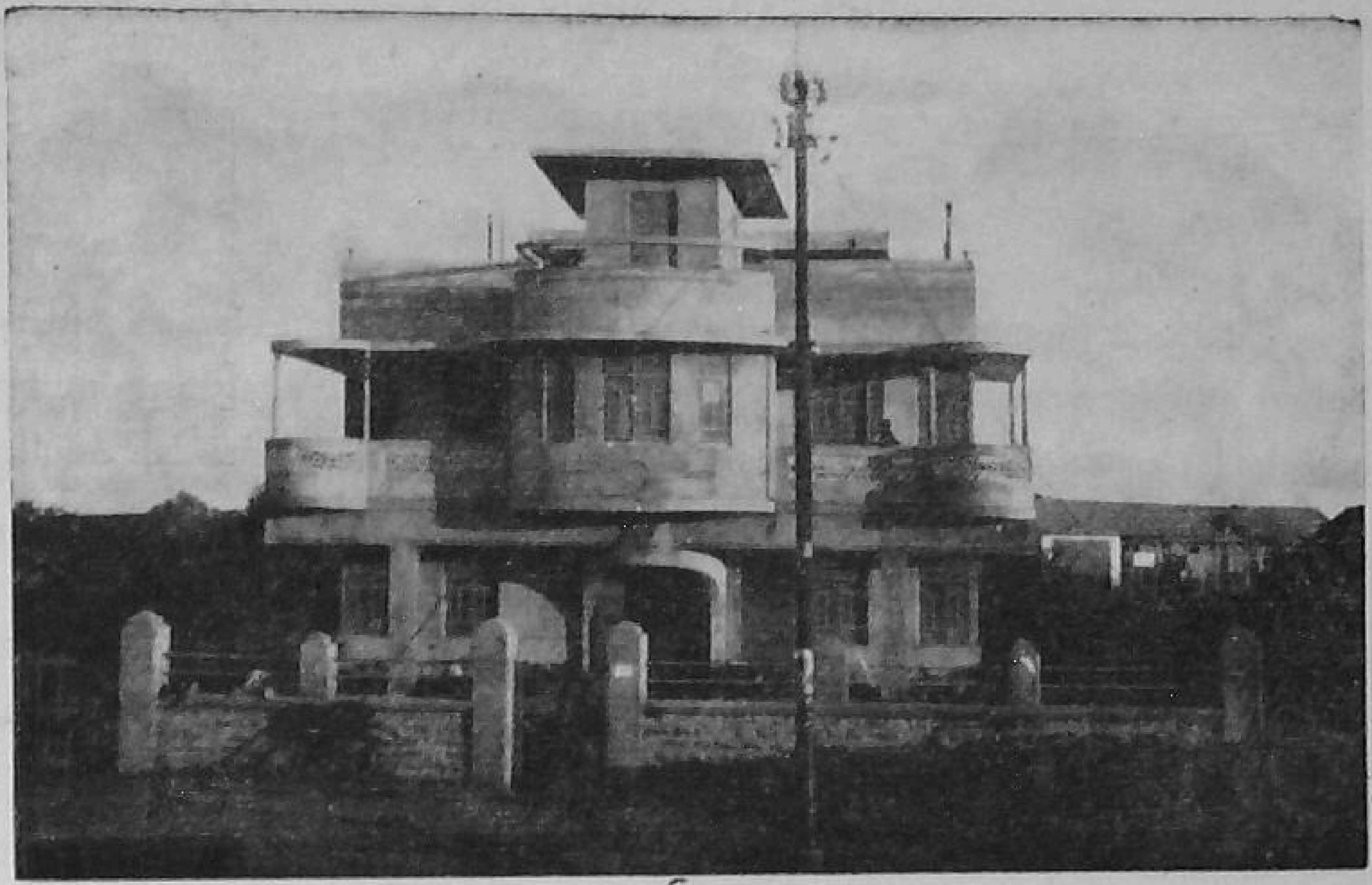
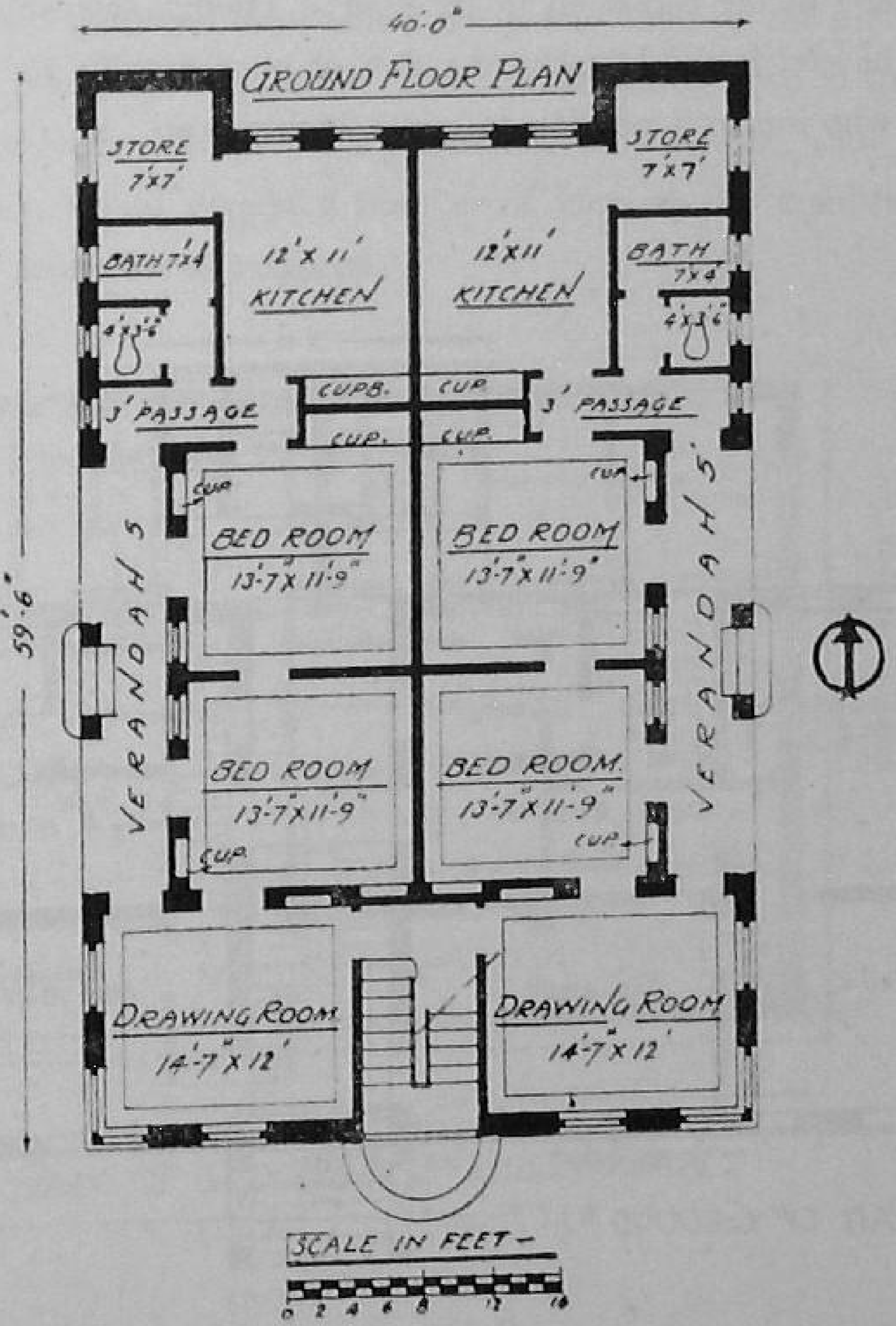


Fig. 72



Architects:
SANE & CHEMBURKAR,
BOMBAY.

Fig. 73

PLAN NO. 23

Floor Area of two storeys: 5,168 sq. ft.

Pre-War Cost: Rs. 22,000

The flats represented below belong to the type of Plan Nos. 17 and 19, but are an improvement upon them. The verandah in front is altogether omitted, and similar economy is made in doing away with the lobby, which has resulted in increasing one room. The sizes of all the rooms are large. There is a separate store-room provided and the bath-room and w. c. are arranged in a separate appurtenance on the rear side, and they can be reached either by the door in the hall, dining-room or kitchen. The latter is rather a small room, but the separate provision of a dining-room and a store-room more than counterbalances it. If a further improvement is desired, a six feet verandah may be provided in front of the main hall. This would increase the size of the bed-room to 18′ × 12′. Though this would cause some increase in the cost it would make the flats at once suitable for a higher class of people who are in a position to pay a higher rent.

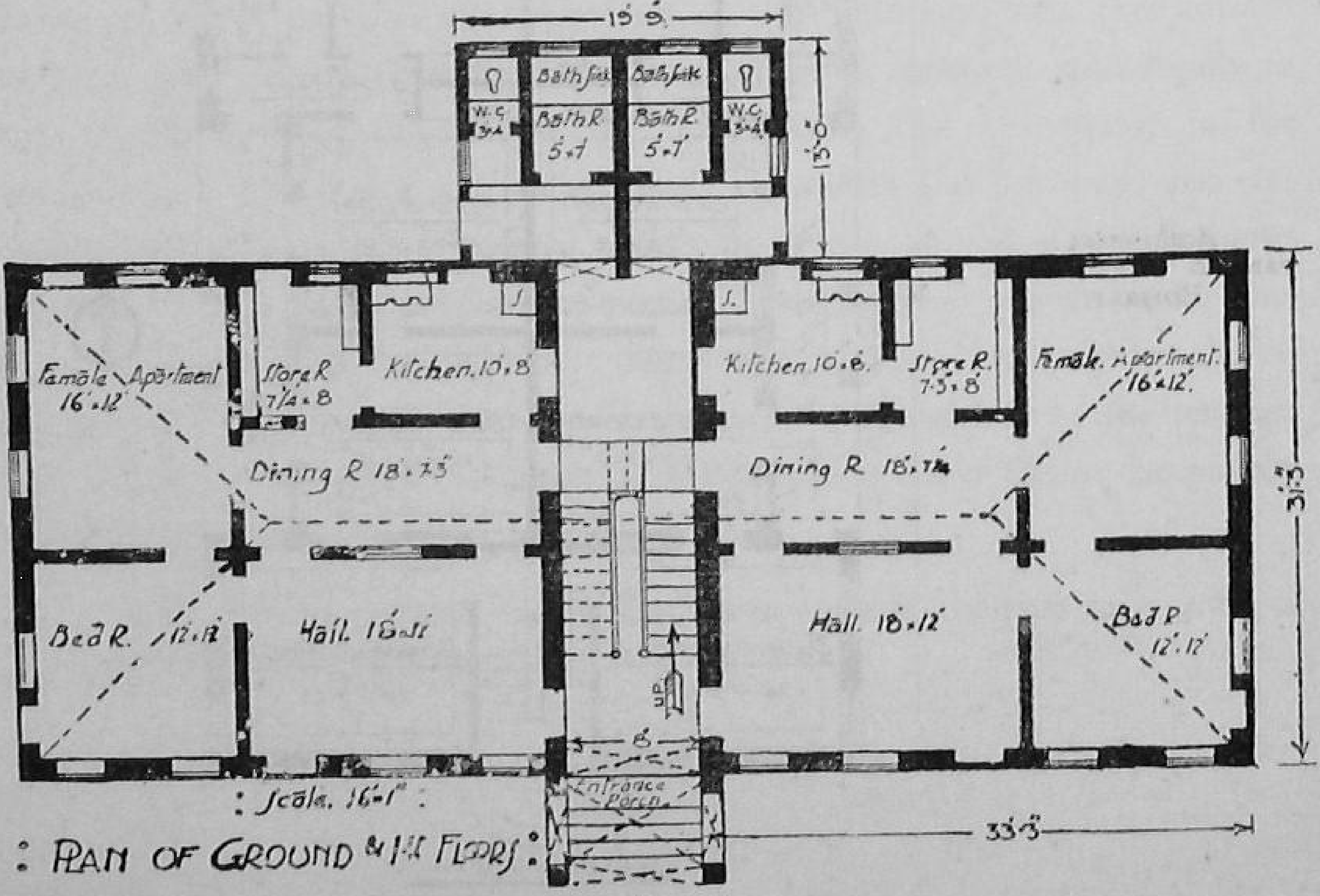


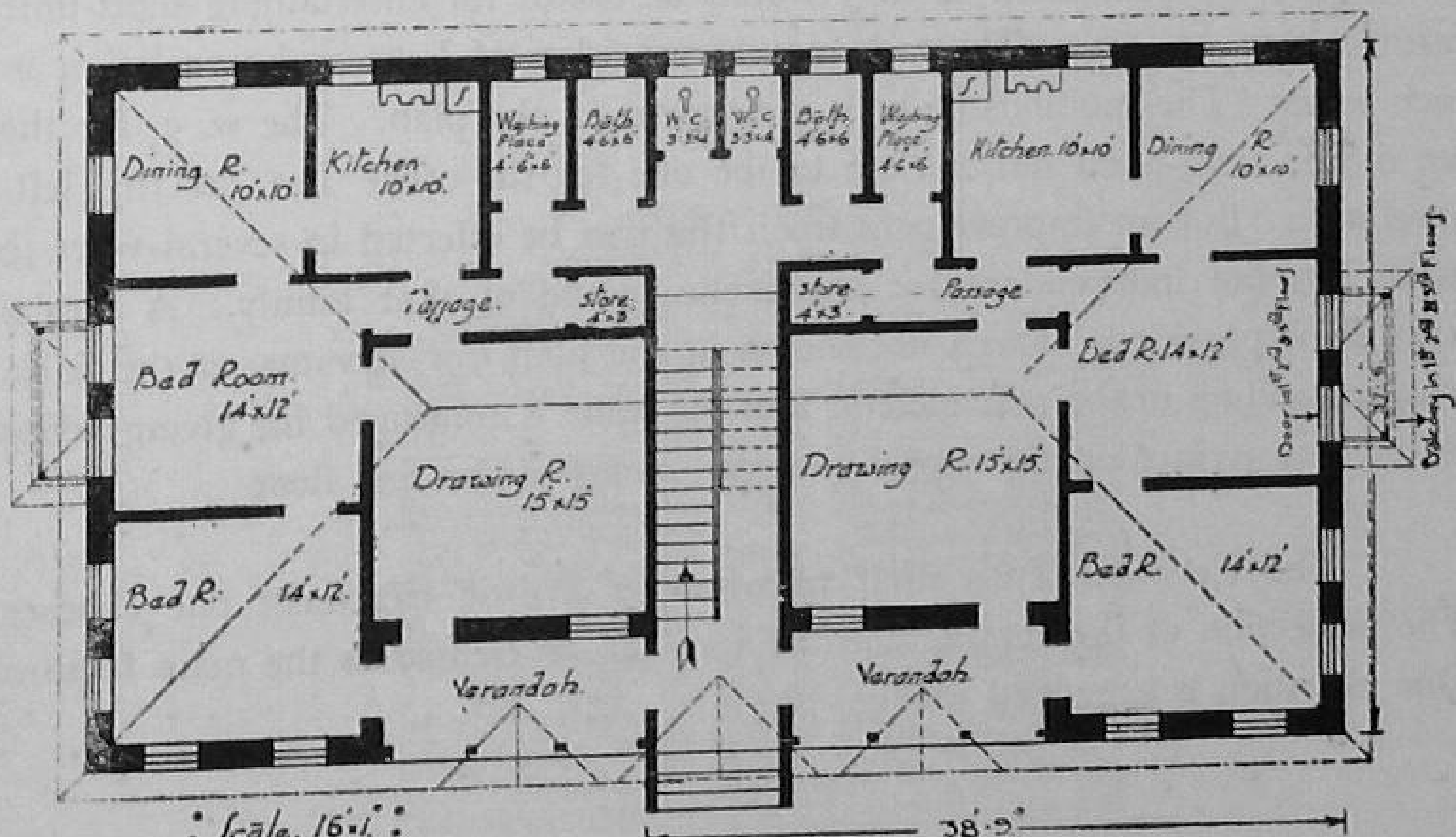
Fig. 74

PLAN NO. 24

Floor Area of two storeys: 5,250 sq. ft.

Pre-War Cost: Rs. 22,500

THE flats represented by the plan below provide accommodation for an upper middle-class family. The sizes of all the rooms are very good. The kitchen, though small, would serve quite well as there are separate rooms for storage and dining, close by. The outer walls are 15 to 18 ins. thick, and all the partition walls are half-brick thick. The weight of the upper floor and roof is taken up by a framework of steel, which is hidden in the partition walls. The staircase is very easy. If another private staircase is required either for servants or for ladies on the upper floor to go down when the front verandah is occupied by visitors, one flight can be provided with its entrance for going down in the passage opposite to the washing-place, which would lead to the middle landing of the main staircase, from where the lower flight of the main staircase can be used for reaching the ground. But this has to be done at the sacrifice of the small store-room. The central position of the staircase, with a slight projection of its bay, would suggest a number of ideas to the architect to make the elevation as attractive as required.



: PLAN OF GROUND, 1st, 2nd AND 3rd FLOORS :

Fig. 75

PLAN NO. 25

Floor Area: 3,850 sq. ft.

Pre-War Cost: Rs. 16,000

IT IS a common experience that the occupants of large tenements use the property more carefully, and also pay the rents regularly without grudge. But there is the risk of these large tenements remaining vacant, since there is less demand for them than for smaller ones. The plan represented by the flats pictured on the opposite page solves this dilemma. Its special feature is that there are two flats on each floor—one of two rooms and the other of four rooms. Further, the grouping of the rooms is made in such a way that if a family, belonging to the upper middle class, be forthcoming to occupy both these flats, they could be easily combined in the manner shown on the plan of the first floor. Not only this, but if a still larger and richer family wants still more space, both the floors can be combined for the occupation of one such family. Thus it is possible to entertain one, two, three, or even four families in the building.

The building faces north and, therefore, the rooms on the right-hand side derive the full benefit of the western breeze. The verandahs in front of the flats, though small, are very valuable, particularly if the tenements are used by different families, as they would be useful for entertaining short-time visitors even to tea. There is ample provision of light and ventilation in each room. The positions of beds are shown on the plan. The w. c. for the use of the right-hand flat is close to the one for the other flat on the left-hand side. But an improvement upon this can be effected in several ways to make it quite independent for the exclusive use of that family. A special staircase is provided, though not shown in the plan, for servants, at the back, with its landing in the rear gallery, and the same is continued for giving access to the roof terrace on the top of the rear rooms of the first floor.

The elevation lends itself to whatever artistic treatment one chooses. The projection of the central staircase bay can be treated as the main feature. One elevation is suggested in Fig. 78.

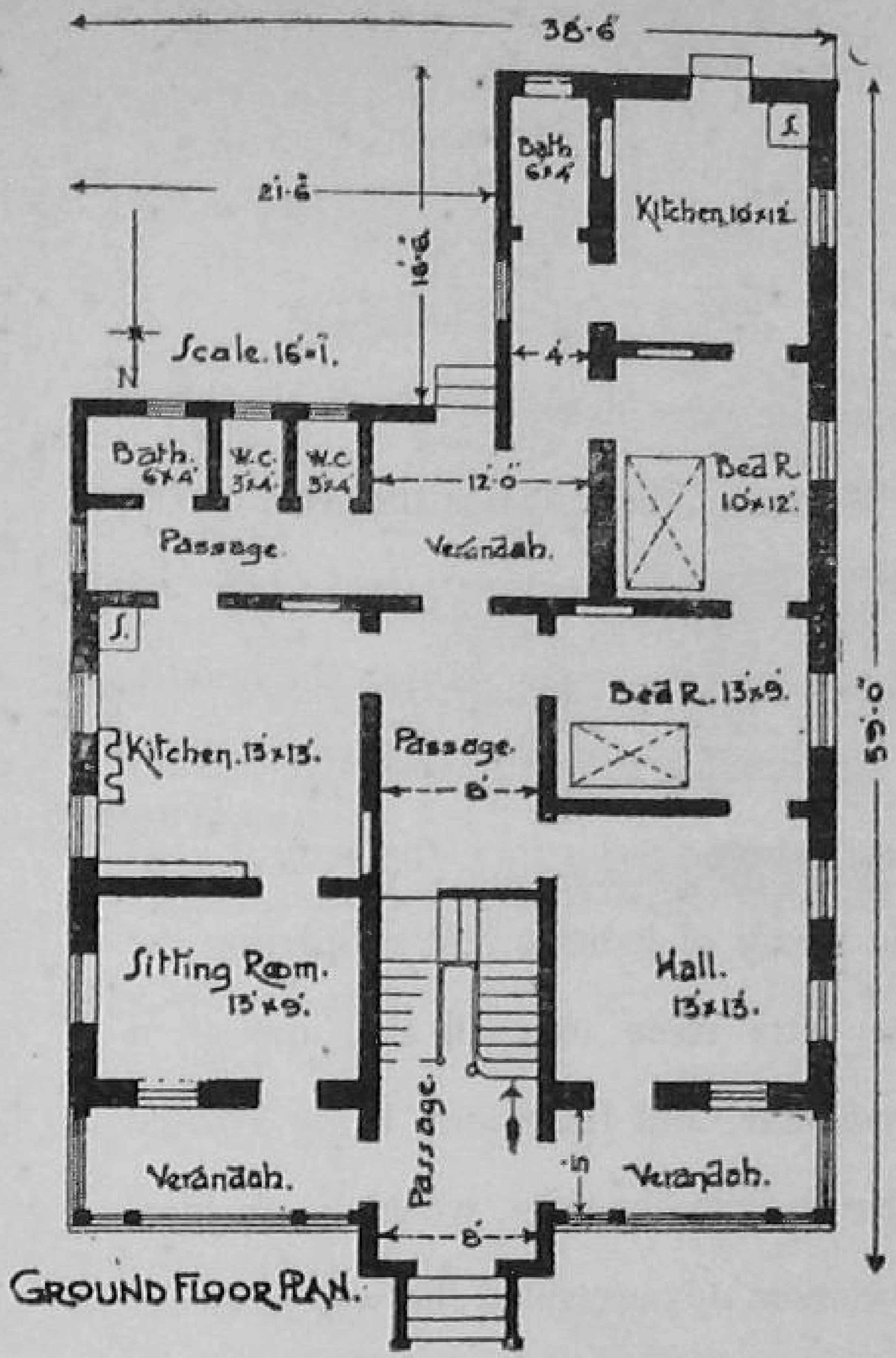


Fig. 76

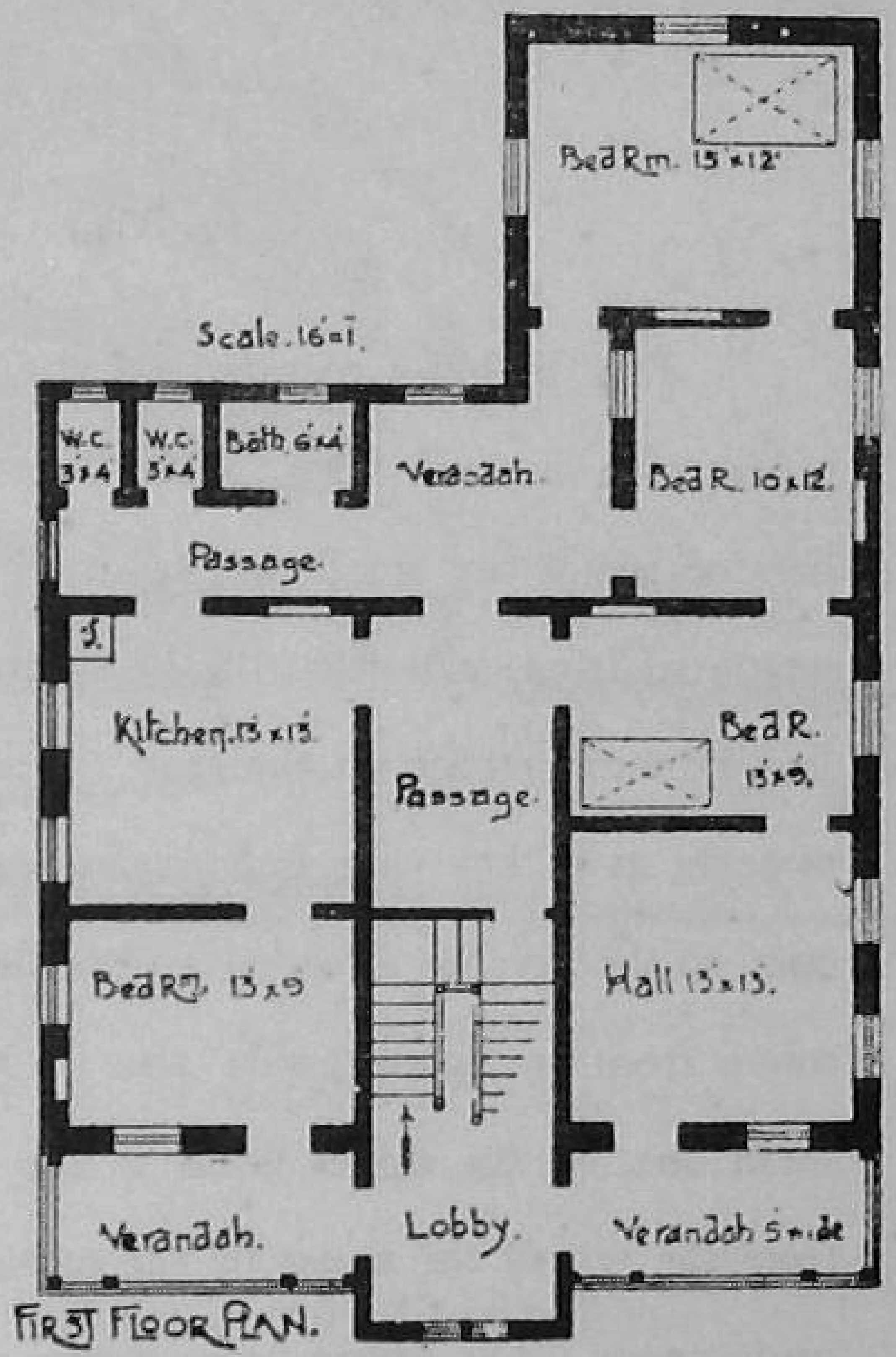
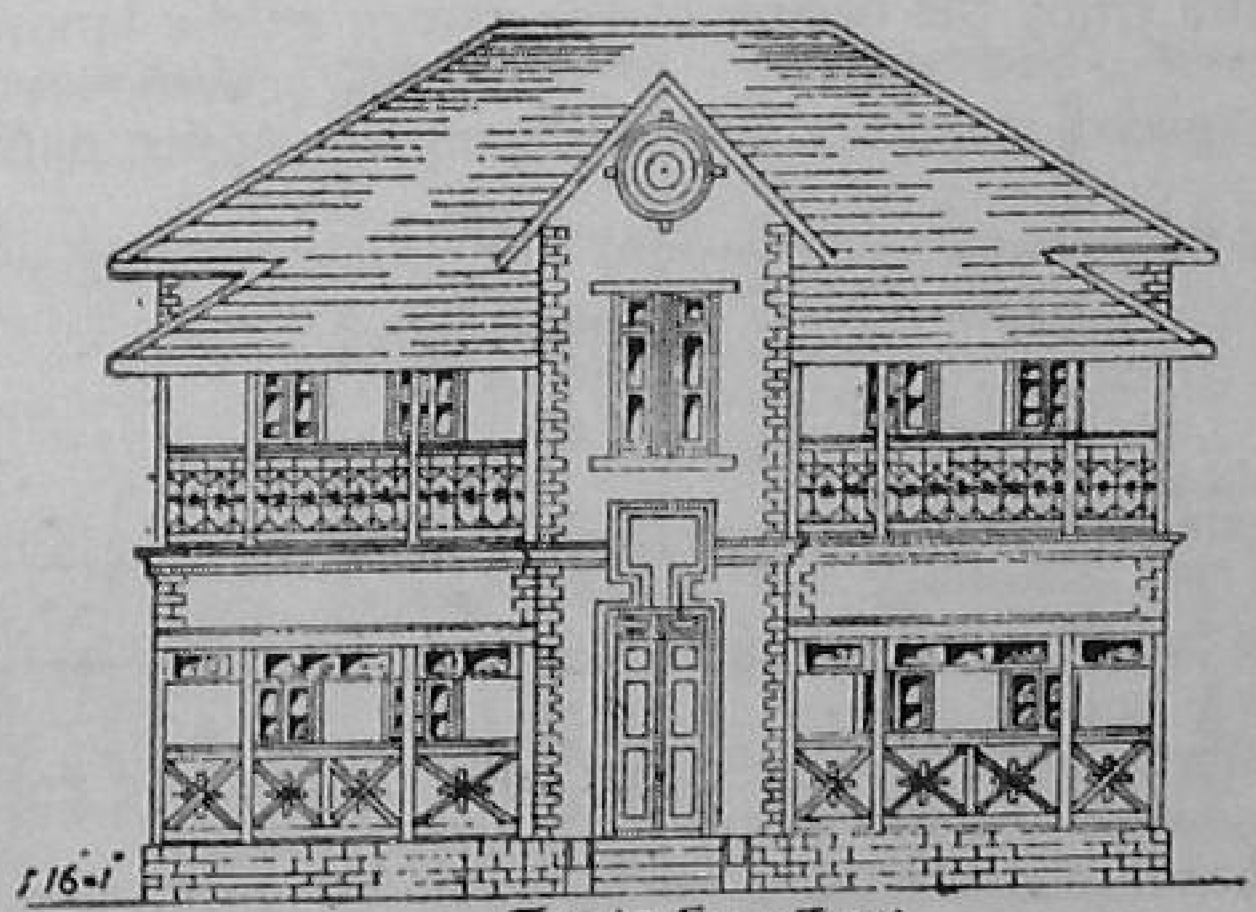


Fig. 77



FRONT ELEVATION.
Fig. 78

PLAN NO. 26

Area of three floors: 5,760 sq. ft.

Pre-War Cost Rs. 25,000

THE building pictured on the opposite page provides two flats of four rooms each on each floor. The special feature of these flats is that though the sizes of rooms are small, unlike usual flats which are semi-detached, these are separated from each other by the staircase in the front, open yard in the middle, and a motor garage on the rear. This has resulted in giving complete privacy to each, as if they were independent cottage homes. Further, the central yard open to the sky has afforded an excellent means of lighting and ventilating the rooms from the opposite side also. One extra room to each flat, though a small one, on the upper floors is also available, and this room, being isolated from the rest of the house by the passages on both the sides, would be an ideal study room. The upper floors derive one more advantage of the wide galleries on the sides, and balconies on the front and near the kitchen. The provision of the latter, in particular, is sure to go a long way in relieving the feeling of drudgery on the part of the housewife, as she could, at intervals, step into it to breathe fresh air and enjoy the beauty of the garden or the landscape and feel refreshed. These special amenities, especially on the upper flats, are sure to be appreciated by the tenants, who would not grudge paying willingly much higher rents.

The trim exterior lines are a true reflection of the snug and comfortable living inside. The wide entrance, the bold projecting galleries symmetrically built, the vertical shaft of the staircase room with its crowning flat roof, all contribute to lend a charm to the building which might be coveted even by the rich.

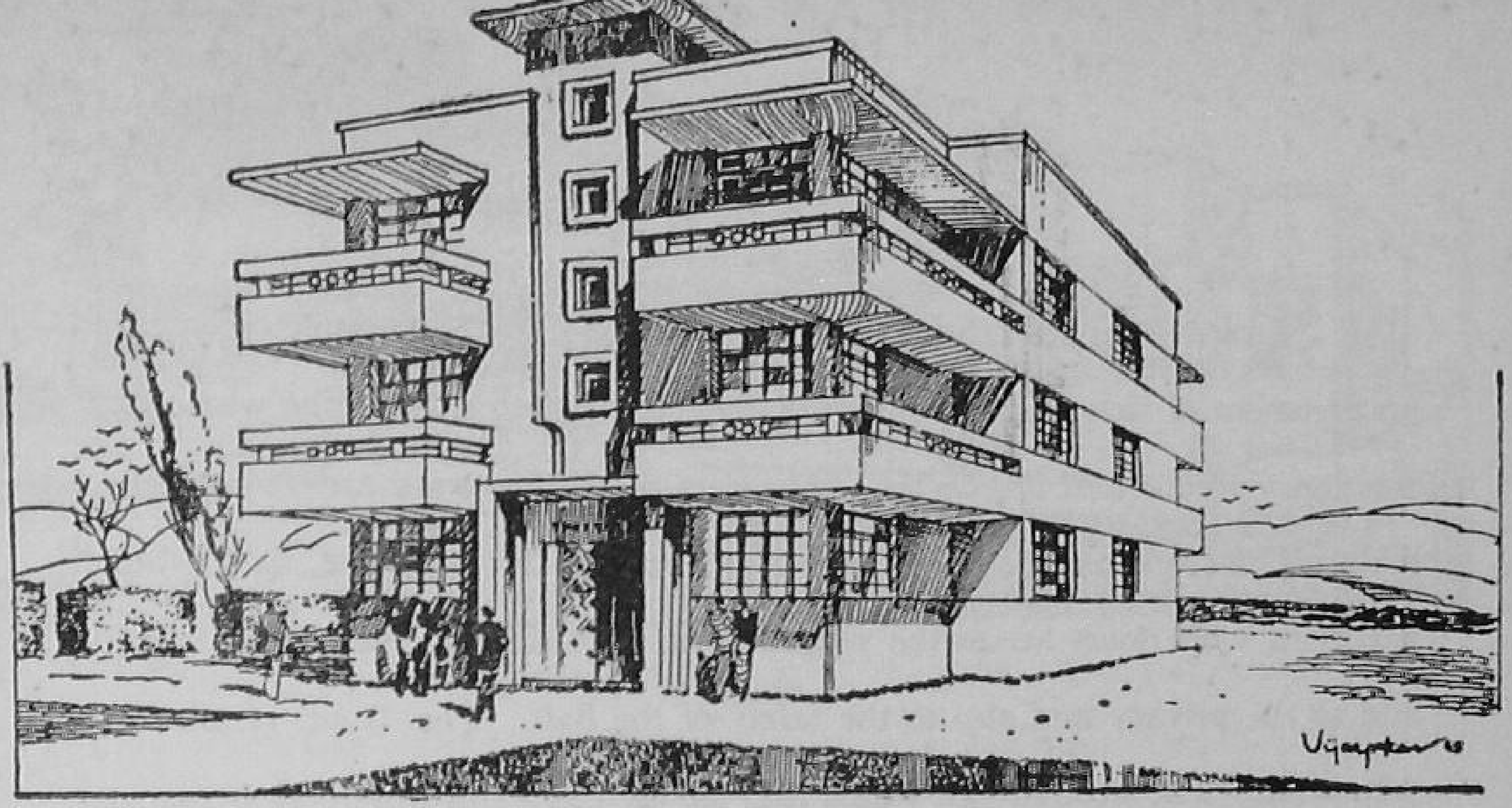


Fig. 79

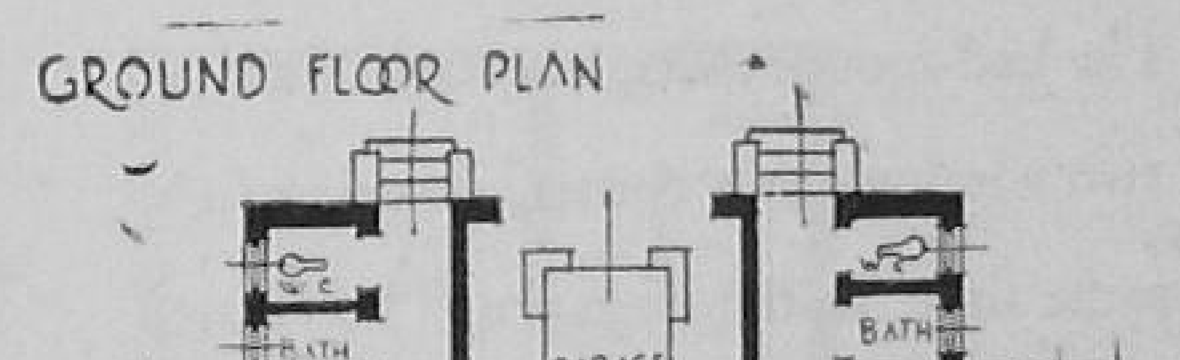


Fig. 80

Fig. 81

PLAN NO. 27

Plinth Area: 2,960 sq. ft.

Pre-War Cost: Rs. 14,000

THE *de-luxe* flats shown in Figs. 82 and 83 are an example of balanced arrangement of simple and wonderfully effective masses making the whole composition vigorous and unaffected. The sizes of all the rooms are on a generous scale. The front and back entrances are common to both the flats. Small partitions with doors across the verandah on both sides of the entrance would add to the privacy and also to the safety of the flats. The front verandah is 7 ft. wide. The sitting-room which may be used as a drawing-room is spacious enough. At least two doors in it—one in the front verandah next to the bed-room, and the other between the bed-room and the sitting-room—could be safely omitted, as too many doors deprive a house of its privacy, lessen the room for furniture, and also add to the cost. The bed-rooms, though square in shape, are of ample size and are provided with two windows at a corner, ensuring light and breeze at all times and add, at the same time, to the elegance. Too much space is occupied by passages, but as the flats are of the *de-luxe* type, cost is not the only criterion—more important consideration than that is that they have provided independent access not only to the services but also to every room including the kitchen. A water-pipe in a separate small room is very useful for washing clothes, etc. The kitchen is unusually large so as to provide space for dining normally.

The Trafford sheet sloping roof on the central portion gives a homely appearance, and the perfect symmetrical arrangement lends it repose. The grey colour of the roof matches the white rendering of walls with snowcrete. Thus the house is a nice blending of modernity with conventional tradition.

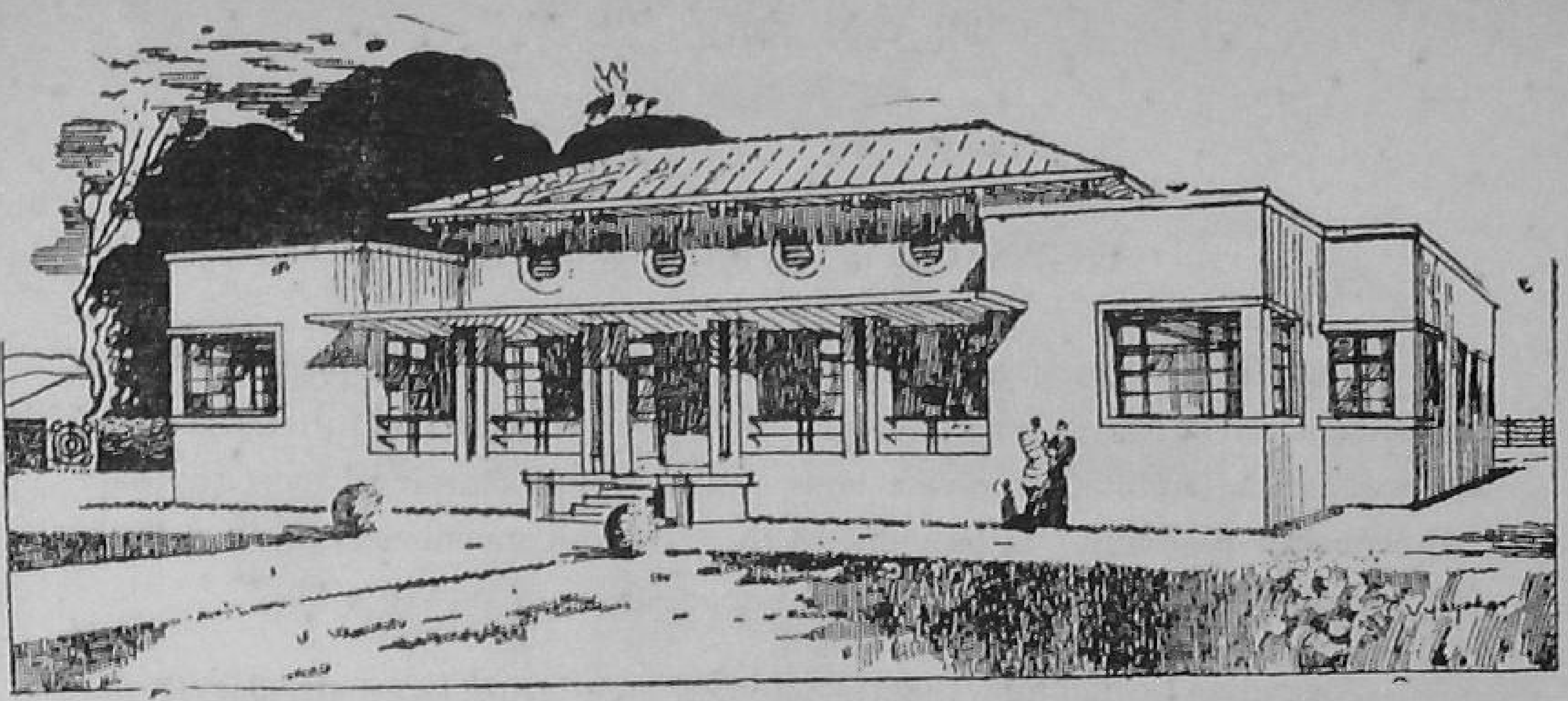


Fig. 82

N
KITCHEN
14'0"X14'0"
3'6" PASSAGE
BATH
W.P.
BED ROOM
14'0"X 14'0"
40" VERANDAH
SITTING ROOM
20'0" X 15'0"
SITTING ROOM
20'0"X 15'0"
N
KITCHEN
14'0"X 14'0"
BATH
W.P.
3'6" PASSAGE
BED ROOM
14'0" X 14'0"
BED ROOM
14'0"X 14'0"
BED ROOM
14'0 X 14'0
VERANDAH 7'0"
GROUND FLOOR PLAN:

Fig. 83

PLAN NO. 28

Plinth Area: 1,470 sq. ft.

Pre-War Cost of two floors: Rs. 13,500

THIS little attractive home, illustrated on the opposite page, embodies the present day trend in house design. It is the result of careful study which has enabled the architect to give a house which is an example of most compact and economic planning. It provides all the modern conveniences and comforts and yet does not waste a single inch of space even in passages.

Ascending a flight of slightly rounded steps with large circular flower boxes at the ends, one reaches the segmental verandah. The drawing-hall in front of it is of adequate size. But if it is desired to enlarge it, it can easily be done in either, or both ways: viz., by shifting the partition between it and the bed-room a little inwards, thus making the bed-room smaller, say, 16 ft. by 10 ft., or it may be extended in the front by 2 or 3 ft., to make it nearly a square room. This would not affect the front view. The bed-room has a small cubicle inside it, which may be treated either as a dressing-room, or a clothes closet. The dining-room of good size is at a very convenient place with respect to the kitchen. The latter is of adequate size, and with a store-room attached to it for keeping all the provisions, would allow some room for two children to take their meals before going to school. The 9 ft. verandah on the rear side would serve both as a sitting-out place and a work verandah. The bath and the w. c. are both very conveniently situated with respect to the rest of the house.

There is another entrance on the left-hand side under the staircase landing. If both the floors are to be used by the same family, this may be kept normally closed as too many openings are bad from the point of view of safety and privacy.

The plan admits of renting out the upper floor to another family, for which purpose the side entrance is provided. If this is intended to be done the staircase room will have to be closed from inside the ground floor. For doing this conveniently it may be necessary to provide the middle landing of the staircase outside the wall projecting on the top of the entrance steps to leave a space of three feet for access to the staircase before climbing is commenced.

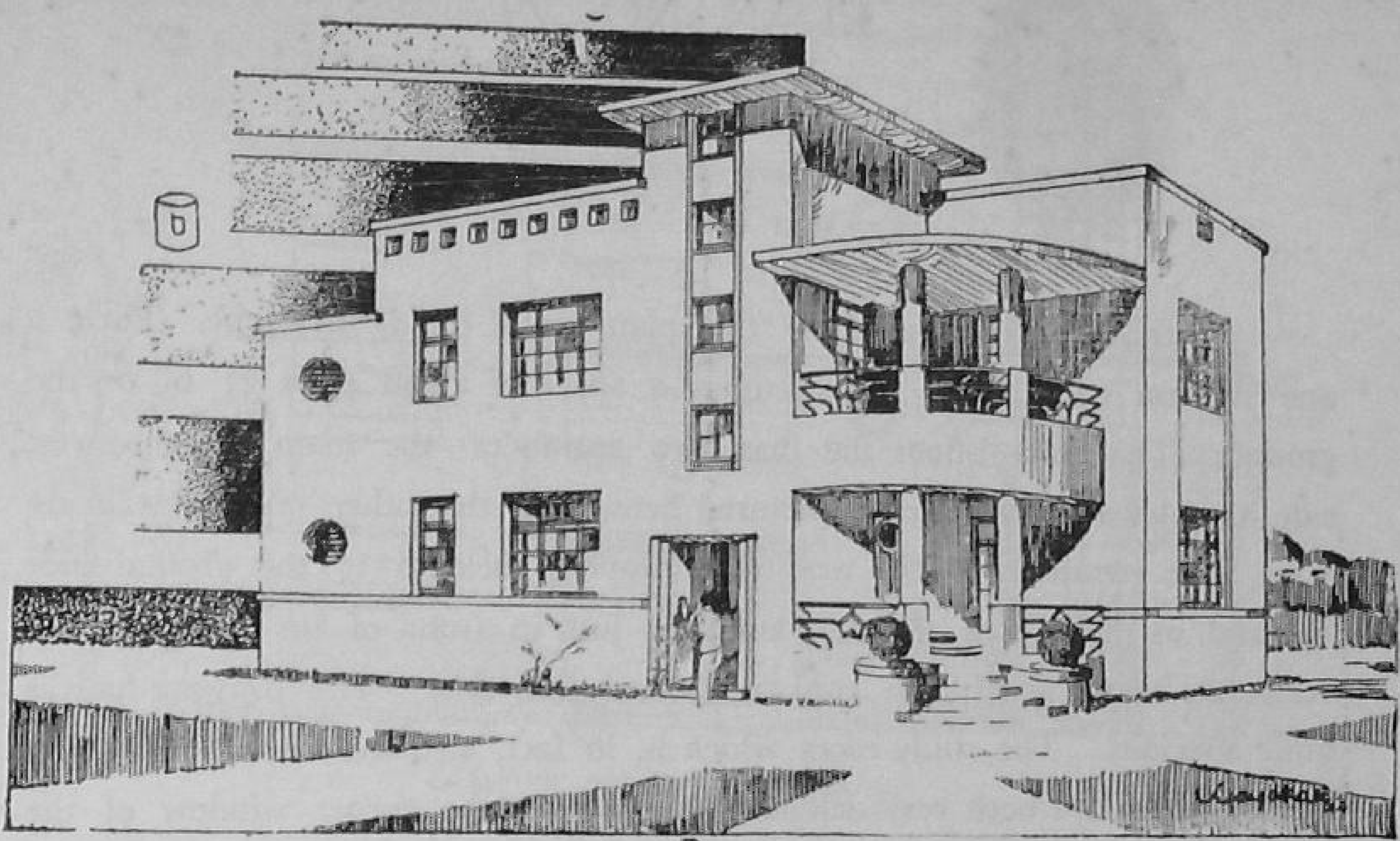


Fig. 84

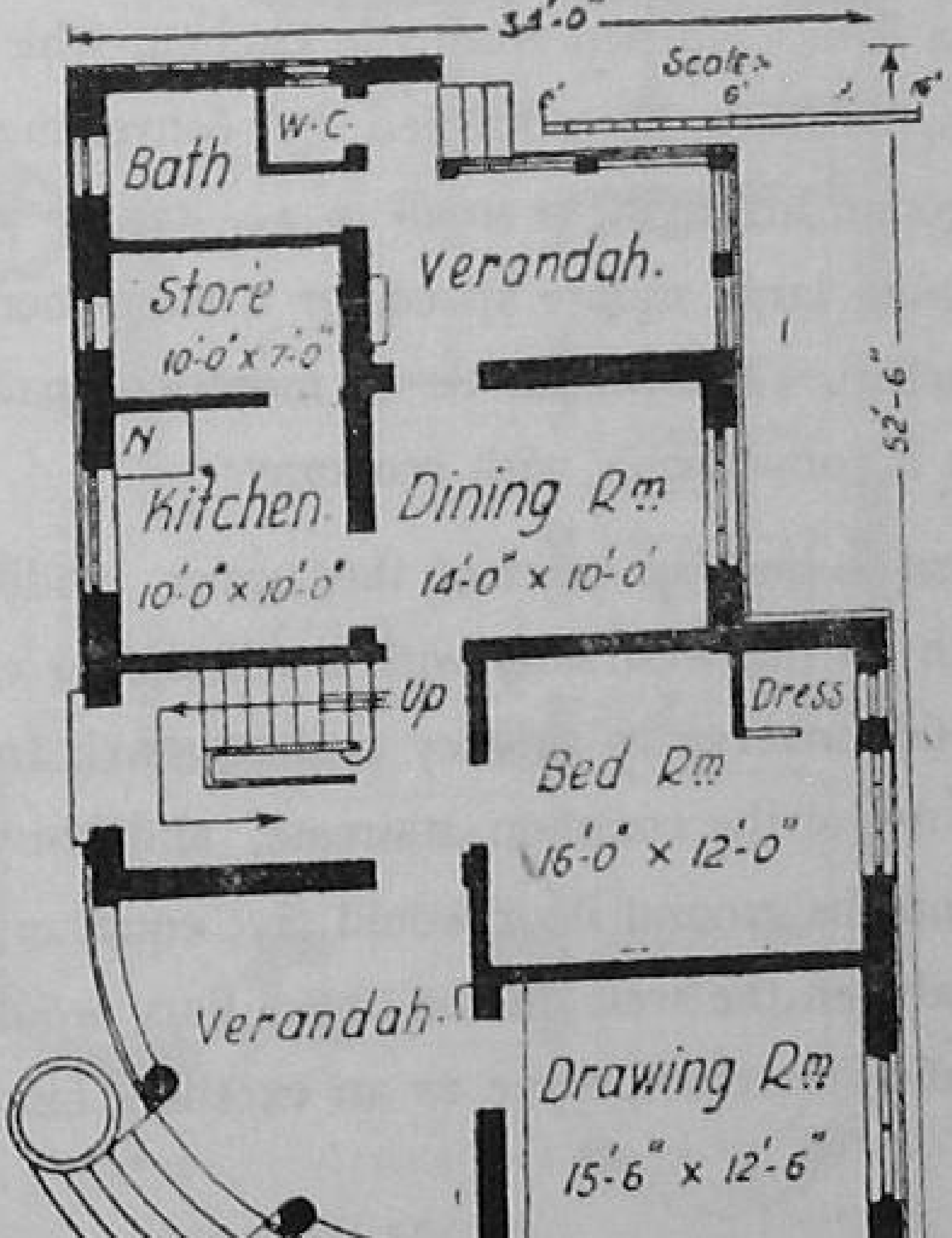

31'-0"
Scale> 6'
16'
W.C.
Bath
Store
10'-0" x 7'-0"
Verandah.
N
Kitchen
10'-0" x 10'-0"
Dining Rm
14'-0" x 10'-0"
52'-6"
Up
Dress
Bed Rm
16'-0" x 12'-0"
Verandah.
Drawing Rm
15'-6" x 12'-6"
:GROUND FLOOR PLAN:

Fig. 85

PLAN NO. 29

Floor Area of three storeys: 4,695 sq. ft.

Pre-War Cost: Rs. 19,300

THE flats represented by this plan are of the *de luxe* type. There is one flat on each floor. It occupies a space of about 45′ x 31′ 6″ on the ground. The ground-floor flat has two entrances—the main on the west side, the elevation of which is pictured here, and the other on the staircase side. The verandah on the west side properly belongs to the ground-floor flat and, as there is a separate entrance just in front of the staircase, the verandah on the south also can be treated like that. The drawing-hall is quite spacious. The study-room which is, in fact, an excellent bed-room and the bed-room are both very delightful rooms with the corner window of the former and the semi-circular bay of the latter. The kitchen, also, is very large, obviating the necessity in normal times of a separate dining-room. There are two bath-rooms, both of which have independent access from any room. The store-room is a little detached from the kitchen, which some ladies might not like. This can, however, be remedied by converting the present store-room into a bath-room, arranging a small w. c. on its right-hand side and utilising the remaining large square space for a store-room, with an entrance from inside the kitchen. This would be a more compact arrangement and would provide also a convenience with economy.

If a partition is built in front of the upper landing of the staircase, across the verandah on the west side, with a self-closing entrance door for the flat, the latter would preserve its privacy perfectly well from the occupants of other flats making use of the common staircase, and thus the same arrangement of rooms as on the ground floor would give equal or, perhaps, more comfort as the verandahs on the west on the upper flats would no longer be an entrance passage and, therefore, serve as an excellent lounge in the midst of refreshing breezes.

The elevation is modern and lends itself to any variations according to the choice and taste of the landlord.

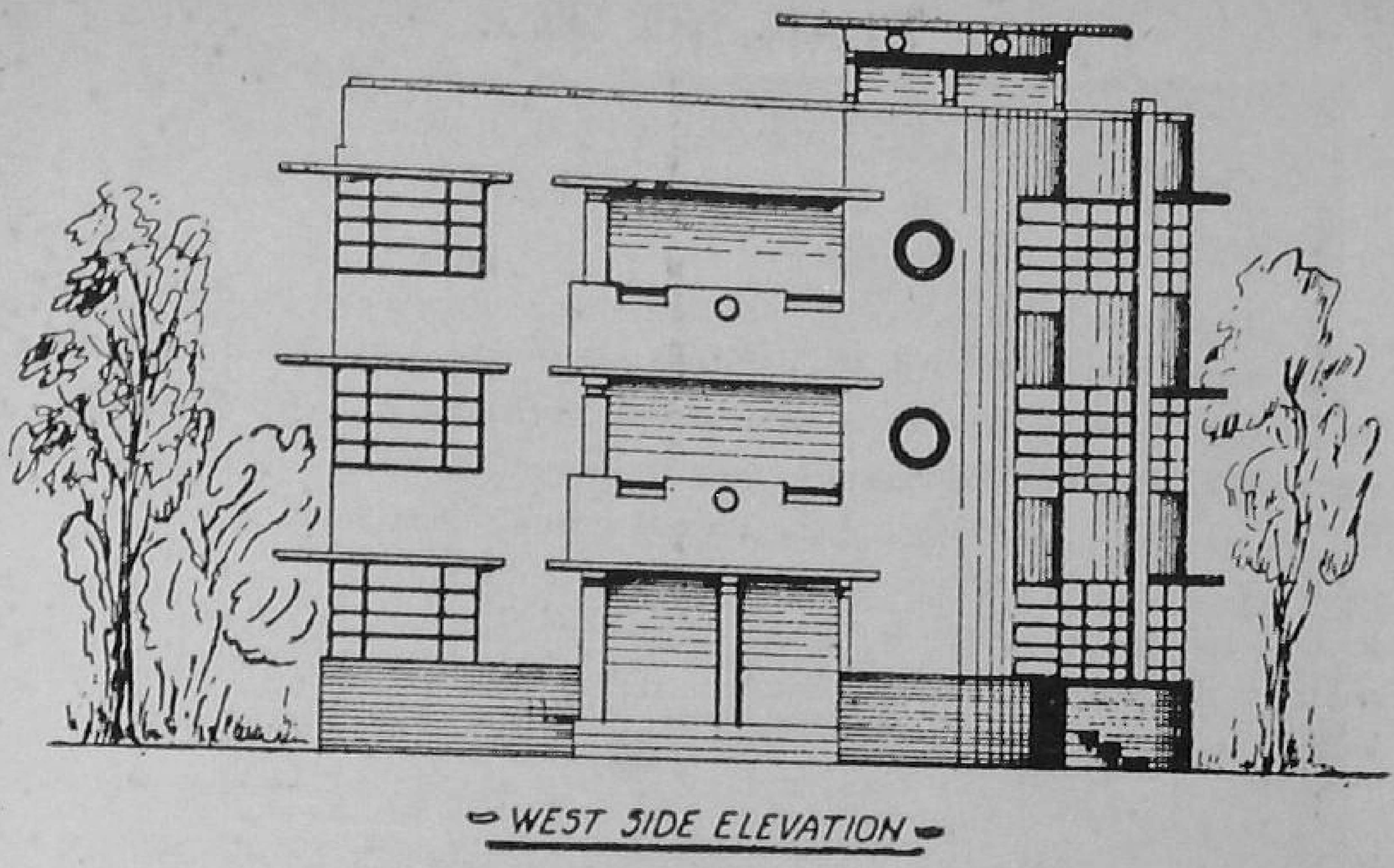

WEST SIDE ELEVATION

Fig. 86

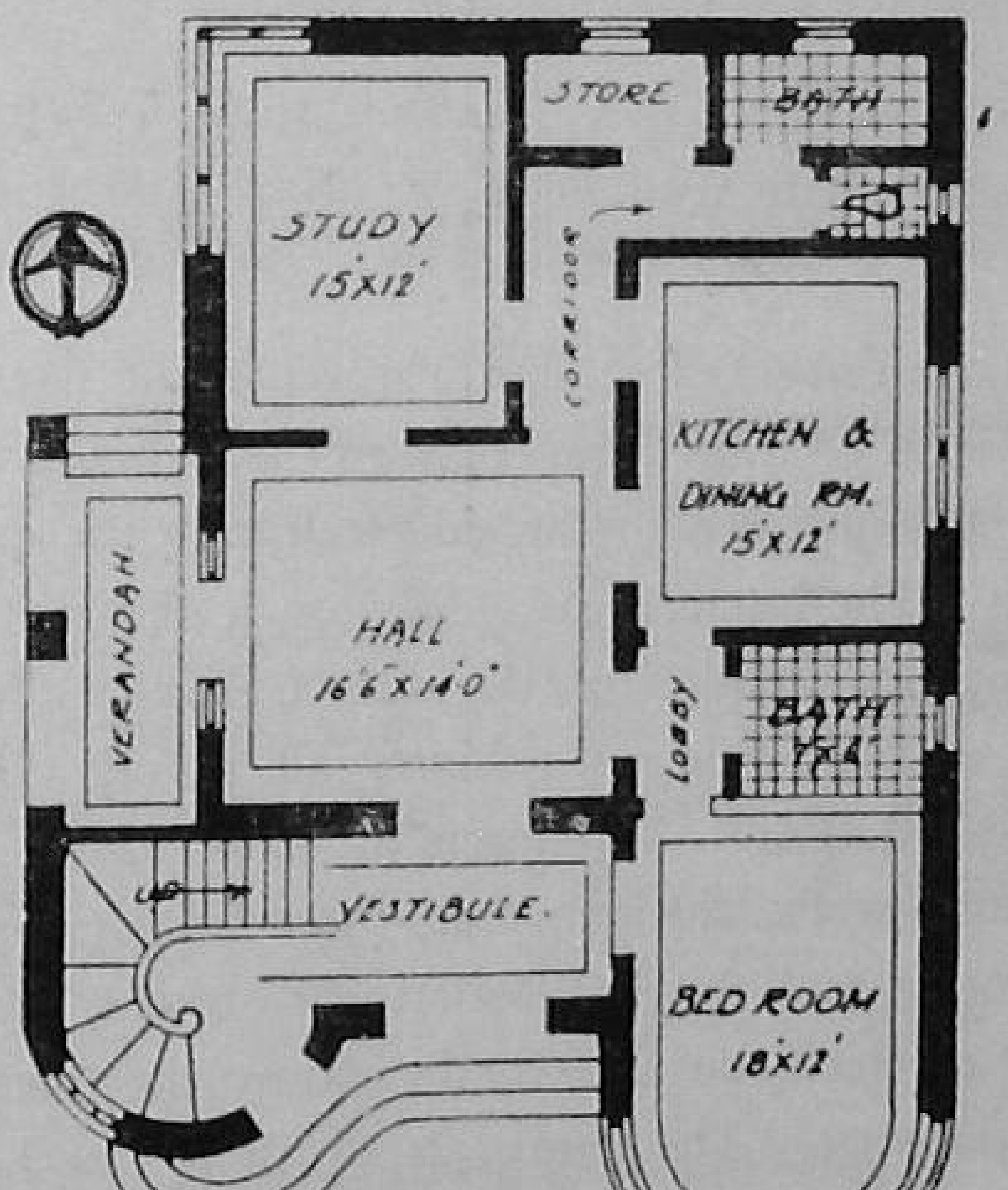

STORE
BATH
STUDY
15'X12'
CORRIDOR
KITCHEN &
DINING RM.
15'X12'
HALL
16'6"X14'0"
VERANDAH
LOBBY
BATH
UP
VESTIBULE
BED ROOM
18'X12'
SCALE IN FEET
0 4 8 12 16 20 24
GROUND FLOOR

Fig. 87

PLAN NO. 30

Floor Area: 3,978 sq. ft.

Pre-War Cost: Rs. 15,000

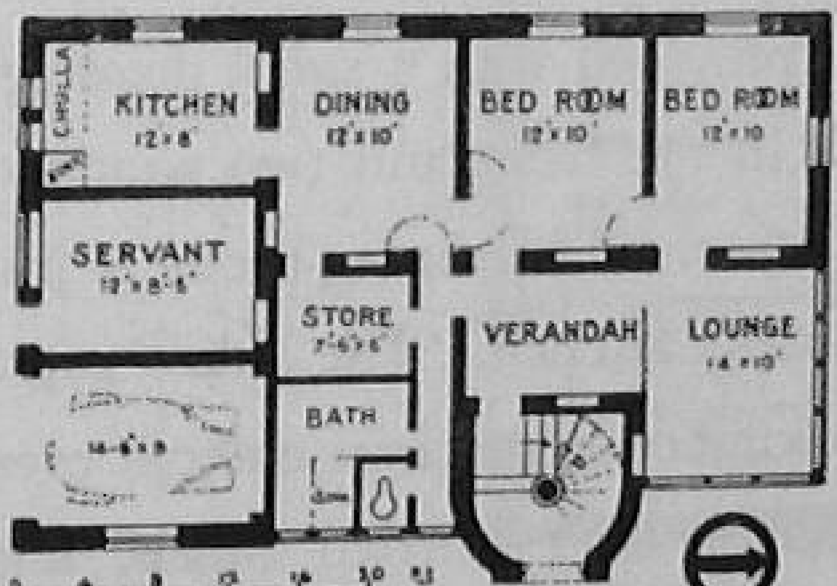
THIS is another plan of *de luxe* flats, designed and built by the author of this book for himself. It is standing in a corner plot with the main road on the east, the subsidiary road on the south. The staircase, together with the entrance, is treated as the central feature by projecting it in a semi-circular bay with a tall front window. A garage and servant's room are accommodated on the ground floor with entrances from the subsidiary road. This floor is let to a middle-class family, for whom the number of rooms is increased by reducing their sizes. Thus, a kitchen, dining, two bed-rooms, verandah, lounge, store and bath are all conveniently provided in the small space.

The upper two floors are reserved by the owner for his family. On the first floor, the kitchen, store and dining-room form one unit, on the left-hand side, a bath, w. c. and a sink with a wash-hand basin are arranged between the dining-room and the staircase, and a ladies' room, drawing-room and a lounge are accommodated in the remaining space.

The second floor is treated as a private suite of four bed-rooms and a library, with an English bath, commode, a urinal and toilet-room attached for common use.

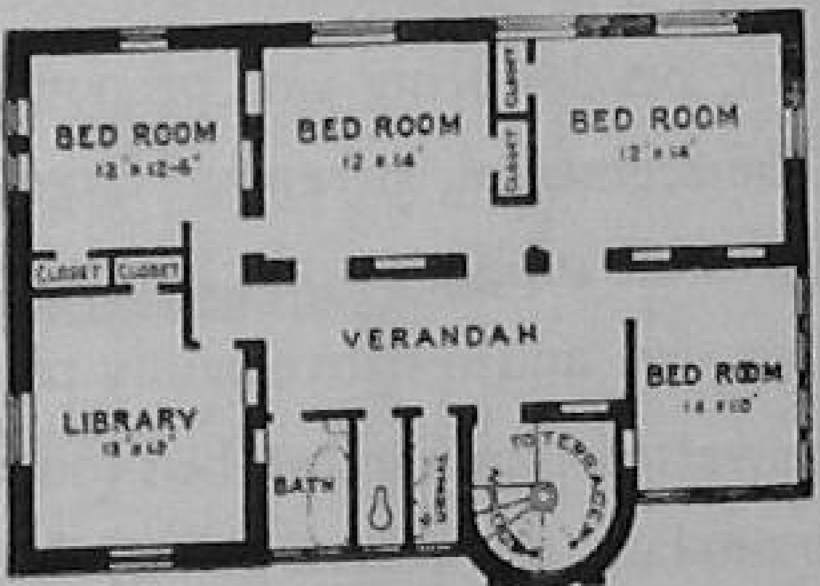
There are a number of unique features in the house. The R. C. C. staircase 3½ ft. wide, 6½″ risers, has steps 18″ at one and 4½″ broad at the other, with outer end embedded in the side wall and the inner over-hanging from bottom to top. The kitchen has *chullas* on a platform 2′ high, a twin window in the front, and another on the side, a glazed china sink with drain-boards in a corner, and a number of cabinets all round. The paving in all the rooms is of polished slabs. All corners at junctions of walls either with floors, ceiling, or other walls, are rounded. A very large number of wall-cupboards in all the rooms and clothes closets in bed-rooms, are provided. The partition walls are 4″ thick, but insulated against fire and sound. All the bed-rooms are on the west. The lounge in all the floors has the entire east and north sides glazed. Additional wall-cupboards are formed in the space below all the windows. The roof is of the flat-terraced type with a garden all round and the enclosed space, provided with ornamental mosaic paving, serves either as an excellent lounge, or as a sleeping-out place, or also as a dining-place amidst refreshing breeze and most cheerful surroundings. Every room is full of sunshine both in the morning and the evening. There is an arrangement provided for excluding it in the evening in summer.

Fig. 88



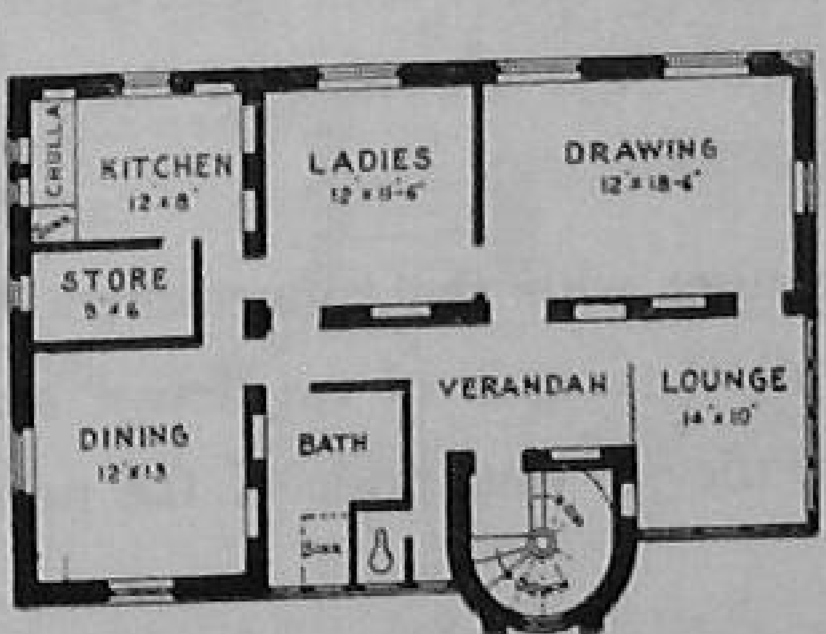
GROUND FLOOR

Fig. 89



SECOND FLOOR

Fig. 90



FIRST FLOOR

Fig. 91

PLAN NO. 31

Area of each floor: 1,820 sq. ft.

Pre-War Cost for two floors: Rs. 17,500

THE five-room home pictured on the opposite page fulfils the dream of a well-to-do middle class family of medium size. From Fig. 92 its trim beauty is obvious, but there are other qualities which make you like it the better, the longer you live in it.

The first thing one can easily note is its economic and compact planning. There is not a single inch of space occupied by passages, and yet the privacy, independent accessibility to each room, and free circulation are all amply in evidence. The two floors could be used by the same family, or one of them could be rented out to a different family. For the upper floor a side entrance on the left-hand side is provided to the staircase room. The latter room is separated from the rest of the house by a collapsible steel gate opposite to the drawing-room. If the upper flat is occupied by a different family a cloth curtain should be hung to cover the openings in the collapsible gate for privacy.

There is a verandah in the front, 8 ft. wide and 20 ft. long. The drawing-room behind it is of ample size. The window in the end wall of this room has a projecting concrete flower box at its sill level. The bed-room in the front, besides being well proportioned, is provided with a small dressing-room. The segmental, sweeping, large window in the front and two windows in the side wall supply ample light and ventilation. The dining-room is just of sufficient size, and is conveniently placed near the kitchen. The ladies' room can be converted into another bed-room. The kitchen is spacious enough even to accommodate the school-going children taking their hurried meals, and has a store-room attached to it. The small verandah in front of it would serve as a work verandah for pounding spices, etc. The bath-room and w. c. are both very conveniently located. The grouping of the rooms in general is excellent.

The exterior synchronises with the conveniences and comforts within. Thus the house provides all the needs of an active and alert middle class family and is sure to prove the joy and pride of the possessor.

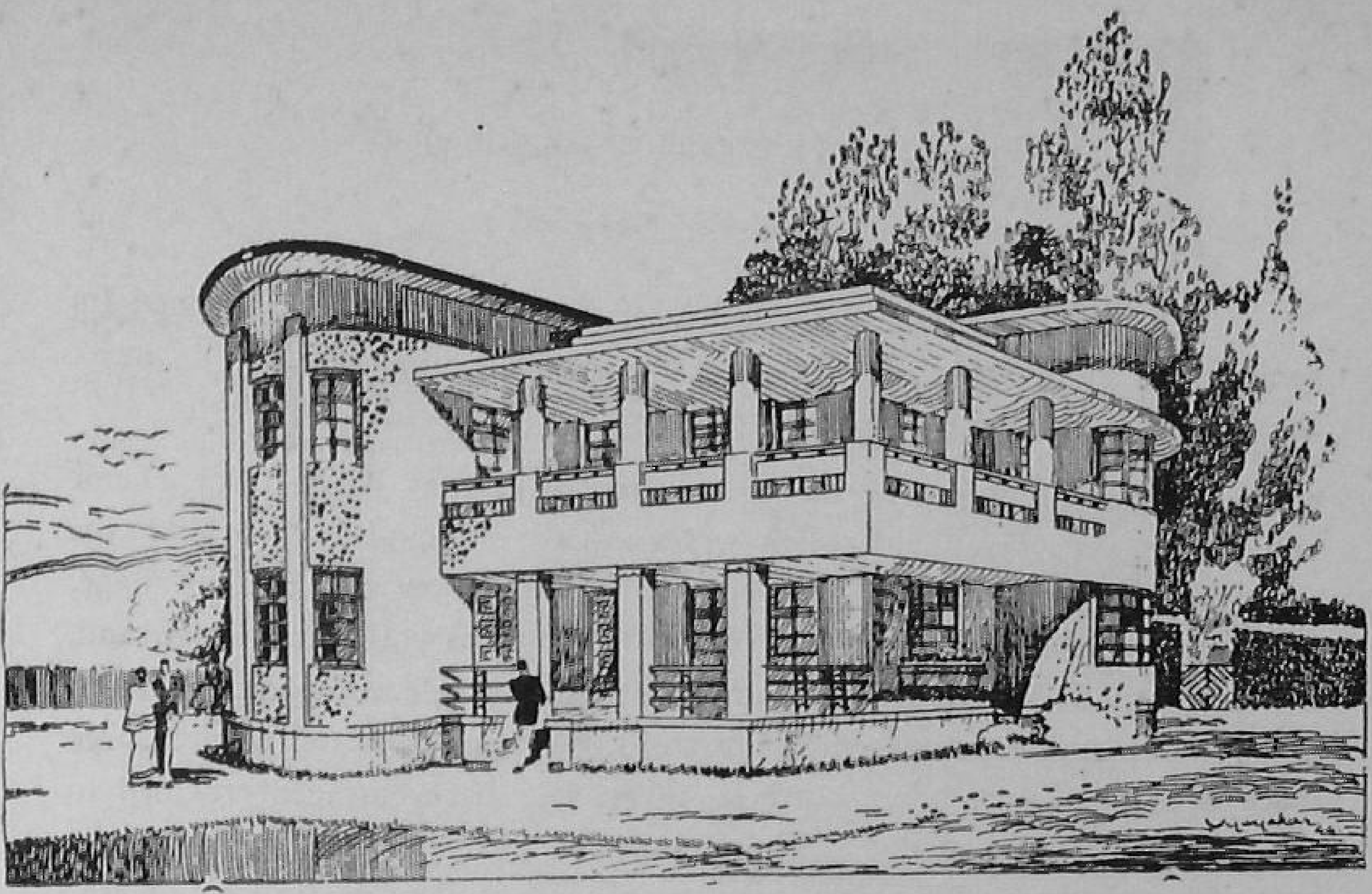


Fig. 92

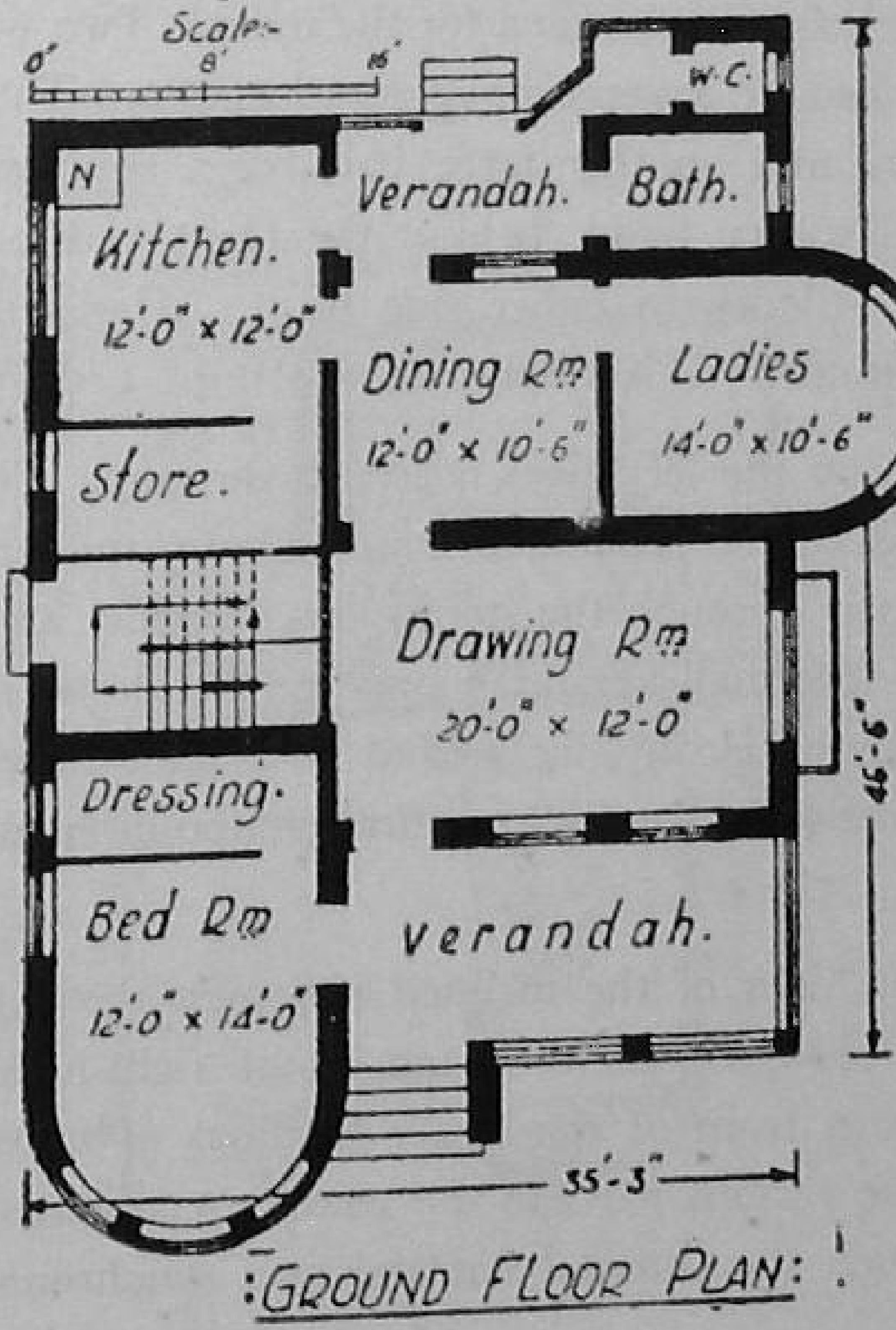

Scale-
0'
8'
16'
W.C.
Verandah.
Bath.
N
Kitchen.
12'-0" x 12'-0"
Dining Rm
12'-0" x 10'-6"
Ladies
14'-0" x 10'-6"
Store.
Drawing Rm
20'-0" x 12'-0"
Dressing.
Bed Rm
12'-0" x 14'-0"
verandah.
45'-6"
35'-3"
:GROUND FLOOR PLAN:

Fig. 93

PLAN NO. 32

Floor Area of three storeys: 5,518 sq. ft.

Pre-War Cost: Rs. 25,300

THIS is another plan of excellent flats *de luxe,* specially designed for comfort. It faces a street on the north side and thus all the bed-rooms derive the benefit of the soothing breeze from the west.

The main entrance to the ground floor is midway in the front, at one end of the 4 ft. verandah, which serves as a waiting-place. Behind the verandah is a drawing-cum-dining-room, large, but almost square in shape, and a passage connects it to the kitchen. The latter is not a small room and, therefore, should provide the necessary space for 2 or 3 seats for dining, which is the usual requirement of a medium family, except on holidays, when a large space is required for dining together. There is a back entrance provided to the kitchen through a lobby. A small room is attached to the kitchen on the rear side, with the double object of either for use as a store-room or as a washing-place. It is desirable to have a separate washing-place for each family, particularly in large cities like Bombay. With the latter view in mind, an entrance to it from outside is provided for the maid. Two w. c.s and a general bath-room are provided at a very convenient location. There is, besides this, a general bath-room, and another large bath-room equipped with a bath, a tub, closet, and a lavatory basin, behind the front bed-room to be used in common by the bed-rooms on either side of it. The general bath-room is very conveniently situated with respect to the third bed-room.

The staircase on the left gives access to the upper floors, on which the same arrangement as on the ground floor is made except that a spiral staircase with an exit door to it, through the store-room, provides an emergency escape, and that instead of the small verandah only 4 ft. wide on the ground floor, a wide over-hanging large balcony, inclined at an angle to lend an effect of boldness and a little surprise in the architectural composition, is provided on each floor.

The sweeping lines of the inclined canopies, the corner windows with long-extending, flat *chhajjahs* on their top in the right-hand corner, the small projecting balconies in front of the upper landings of staircase, together with the proportion of the various parts to the whole, make it an exquisitely beautiful structure in which the internal conveniences synchronise with the beauty of the exterior.

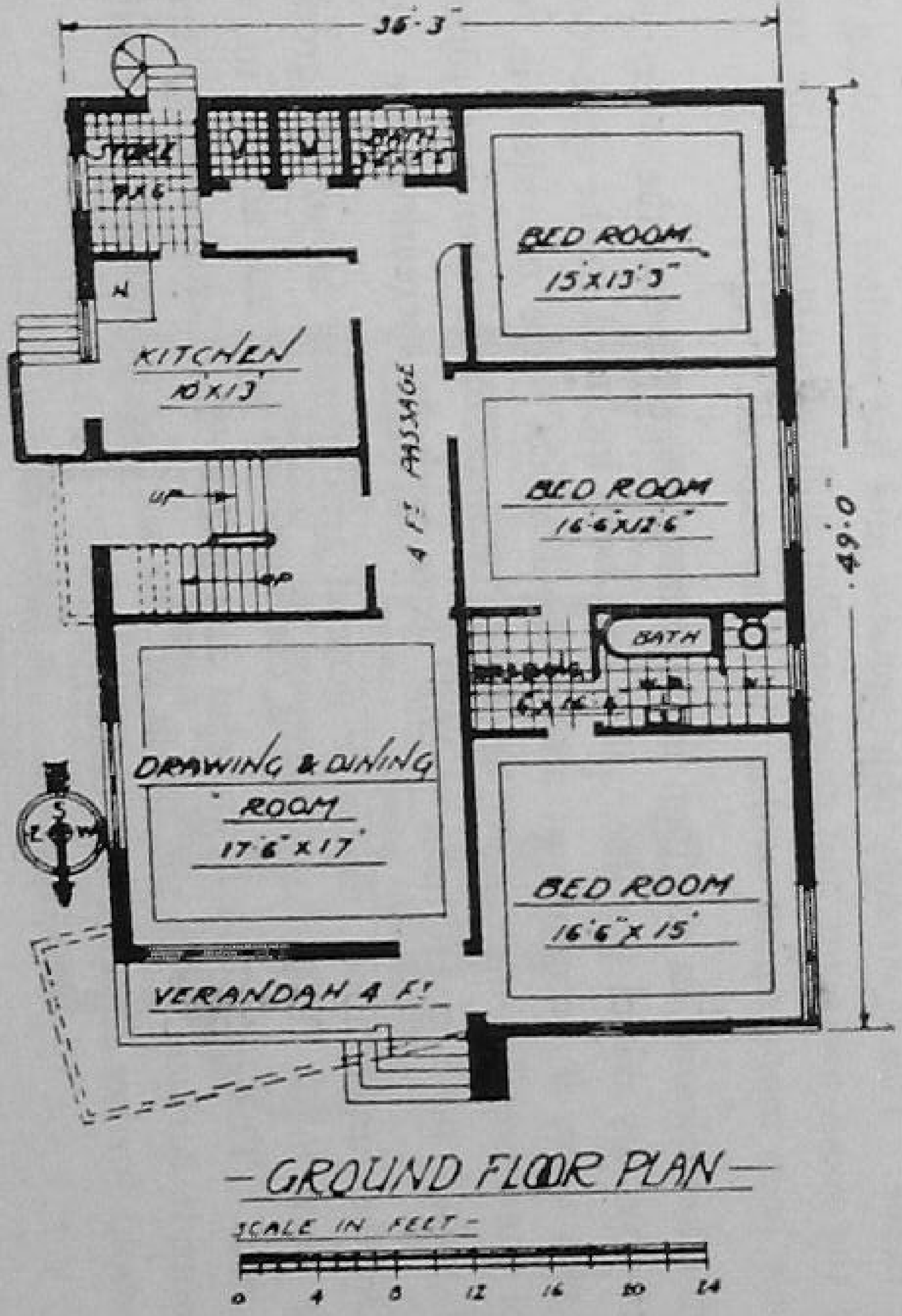


Fig. 95

Architects: Marathe & Co., Bombay.

Fig. 94

PLAN NO. 33

Floor Area of three storeys: 4,353 sq. ft.

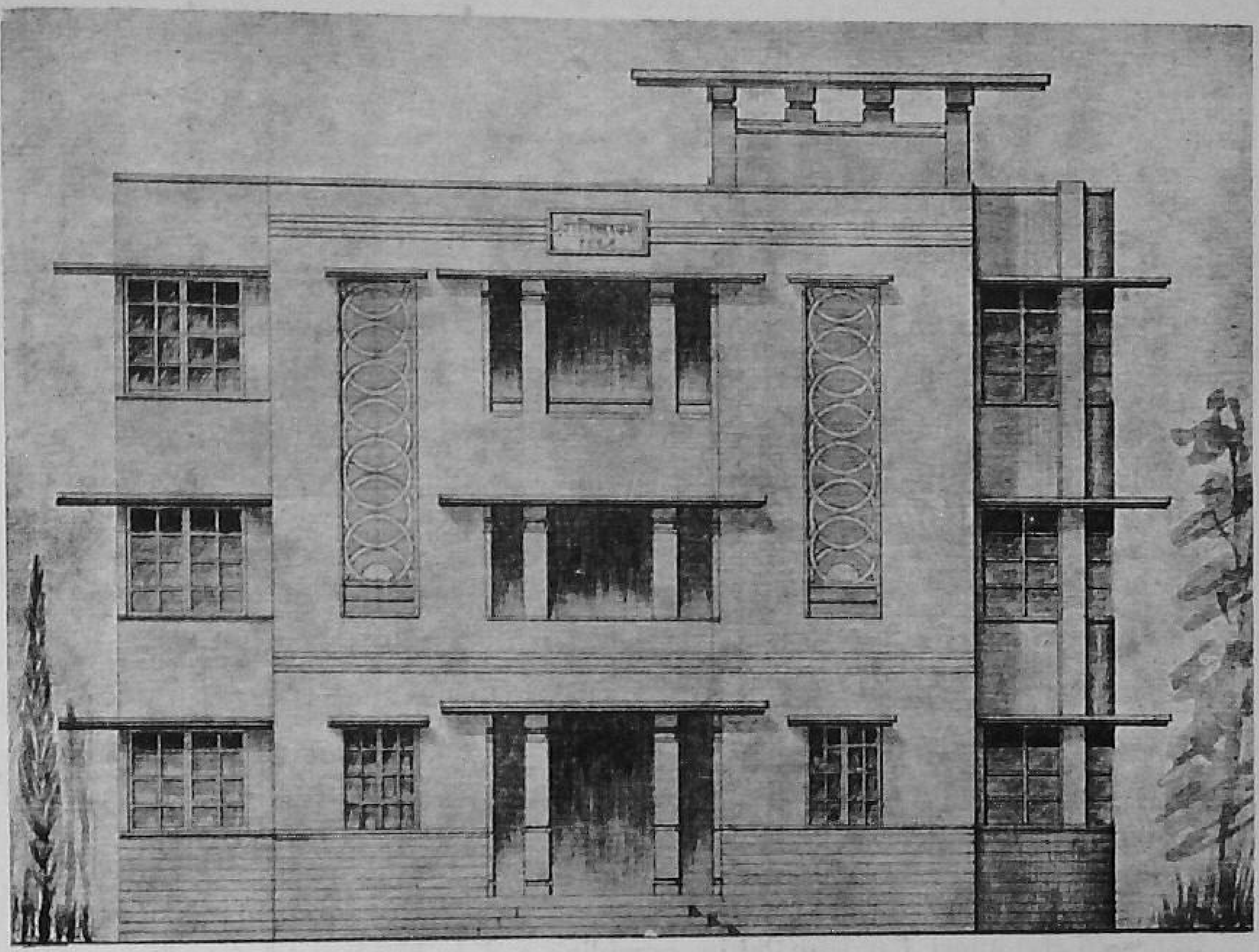
Pre-War Cost: Rs. 19,500

THIS is a plan of flats intended for the occupation of a family belonging to the upper middle class. One flat for one family is arranged on each floor, but the arrangement is more convenient and suitable for one family occupying the whole building. There is a 7 ft. verandah in the front, but if different families occupy different floors, it loses its privacy, unless an independent door be provided through the opening on the right-hand side of the main entrance, and the passage to the staircase is closed by means of a partition wall across the verandah The drawing-room occupies the central position and is of a good size, but the verandah beyond it does not serve any better purpose than that of a passage for which a corridor of even three or four feet width, would have sufficed. The bed-room on the right-hand side, with its semi-circular projecting window bay, is a charming room, and the proximity of a bath and w. c. to it, makes it more valuable. The w. c., however, is facing the door in the dining-room and, therefore, to conceal it from the view, a self-closing half-swing door, to close the bath and w. c. block, is necessary.

The architect has sought to bring about a symmetrical effect in the elevation by mutilating one-fourth space of the ladies' room and projecting a corner inside. This is strongly objectionable and has resulted in making the shape of the room awkward and space smaller and inconvenient. The room could have been made square within the same expense.

Another blemish in the plan is that the passage beyond the store-room does not serve any useful purpose. If it had been included in the store-room, and an exit door, if necessary at all, in the kitchen, were provided in the corner of the store just opposite to the door between the kitchen and dining-room, it would have given more useful space without increasing the cost.

On the upper floors, the same general arrangement as on the ground floor has been made. The staircase is continued to give an access to the terraced roof. The elevation is graceful and imposing. Colorcrete rendering on the outside surface, with the bands on the surface in another contrasting colour, would further enhance the beauty.



- WEST-SIDE ELEVATION -

Fig. 96

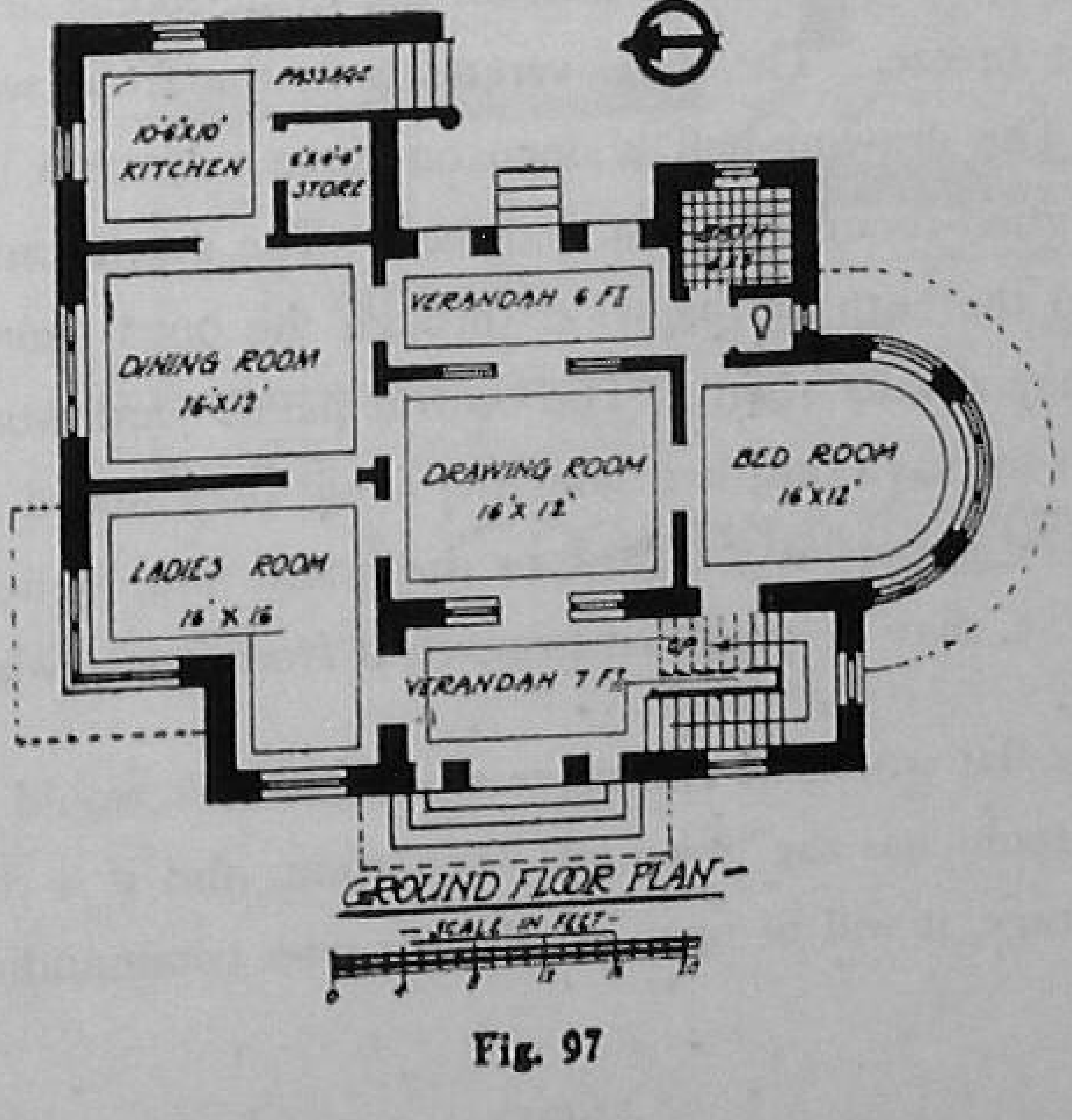


Fig. 97

PLAN NO. 34

Floor Area of two storeys: 3,475 sq. ft.

Pre-War Cost: Rs. 15,000

THE plan on the opposite page is specially designed to provide the best orientation, circulation, privacy, etc.—factors which make for health, comfort and happiness. It is designed as a cottage home, with bed-rooms on the upper floor. But, with some alterations, it can also be adopted as equally comfortable flats, one on each floor. These alterations are: (a) to build a small washing-place in front of the w. c. adjoining the east wall of the garage, (b) to provide a bath-room in place of the right-hand w. c. and the washing place, shown in the plan, (c) to locate the store in the space occupied by the present bath-room, (d) to shift the kitchen and dining-room farther to the north, in place of the existing kitchen and dining-room, and (e) to convert the dining-room into a bed-room. Further, the staircase may be arranged in such a way as to leave a clear headway of 6½ ft. below the landing, if an entrance to the upper flat is made by providing a door in place of the window on the right-hand in the staircase room. This can be done by projecting the staircase bay about 4 ft. on the right-hand side, either in a rectangular or semi-circular form. The latter can then be treated as the central feature.

The plan faces the south, so that all the living-rooms derive the benefit of the south-west breeze. The 8 ft. verandah in the front would be an excellent lounge. The drawing-hall is open on three sides and is an independent room. The guest-room is almost detached. The guests can have an independent access to the bath or the w. c. through the open *chowk* without disturbing the privacy of any room. The central paved yard would be an ideal place for children to play, and their activities could be watched from any room of the house. The garage is attached to the house and, if necessary, a door in front of the w. c. may be provided to reach it from inside when it is raining.

The upper flat would be still more enjoyable as it would provide greater privacy. Every room has the best cross ventilation, and if a room is built on the top of the garage, it will be open on all four sides commanding a wide view.

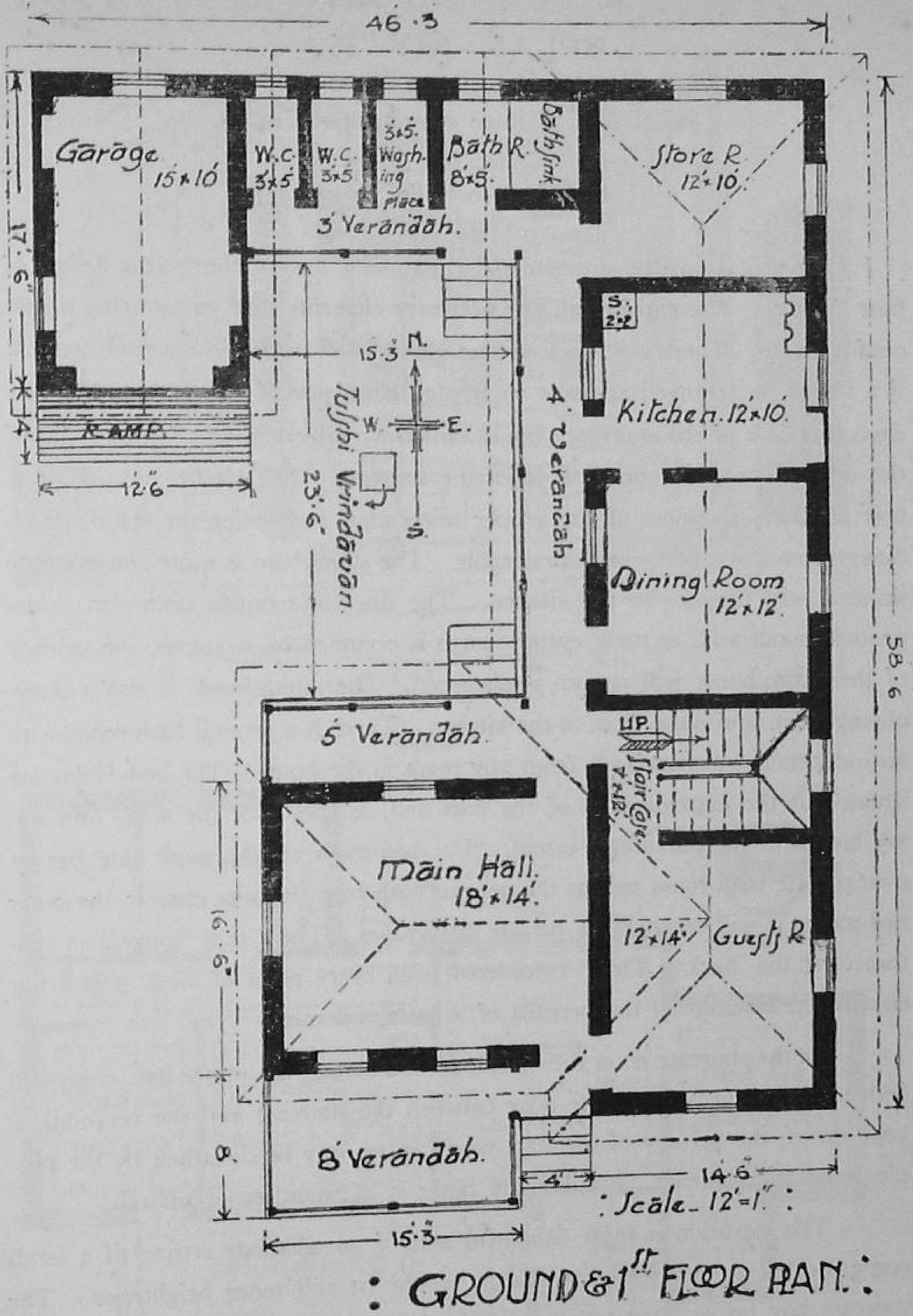

46·3
Garage
15×10
W.C.
3×5
W.C.
3×5
3×5
Washing place
Bath R.
8×5
Bath Sink
Store R.
12×10
3 Verandah.
17' 6"
4'
RAMP
12·6
15·3
N.
W.
E.
S.
Tulsi Vrindavan
23'·6"
4' Verandah
Kitchen. 12×10
S.
2×2
Dining Room
12'×12'
58·6
5 Verandah
UP.
Stair Case
7×12
Main Hall.
18'×14'
12'×14'
Guests R.
16'·6"
8'
8 Verandah.
4'
14·6
: Scale 12'=1" :
15·3
: GROUND & 1st FLOOR PLAN. :

Fig. 98

PLAN NO. 35

Floor Area of three storeys: 4,602 sq. ft.

Pre-War Cost: Rs. 20,300

THE plan on the opposite page represents a very convenient design of flats *de luxe*. It comprises all the necessary elements that go to make a successful design. There is a spacious verandah of 8 ft. width in the front, which, if a screen be arranged across it on the left-hand side of the entrance steps to close the view of the staircase, would obtain a perfect privacy from people of the upper flats going up and down the staircase. The kitchen occupies the best position in respect of the proper orientation and, being an oblong room though small, would be very serviceable. The store-room is quite conveniently situated with respect to the kitchen. The drawing-room is quite an independent room and, as such, even when it is occupied by strangers, the privacy of the entire house will remain undisturbed. The dining-room is also a large, oblong room and quite close to the kitchen. There is a general bath-room with an independent passage to it from any room in the house. The bed-rooms are situated at the extreme sides of the flats and, as they face the west, they enjoy breeze to the maximum extent. The bed-room on the south side has its own private bath-room and as the general bath-room is quite close to the other bed-room, it will serve as its private bath-room. There is a convenient entrance at the back. Thus, considered from every point of view, it is a flat enjoying practically all the benefits of a cottage home.

As the staircase is on the outside in one corner, the upper flats enjoy still better privacy, because, if the door between the staircase and the verandah is kept closed, the privacy of the flats would in no way be disturbed by the people using the staircase, provided the latter is of sound-proof material.

The elevation is most delightful and, if an adequate setting of a landscape garden be provided, its charms would be still more heightened. The staircase bay projects too much beyond other parts and, therefore, catches the eye first, but this feature is relieved by the small corner balconies. The tall windows on either side lend a balancing effect.

Perhaps the only defect of the building is that there are too many corners which must necessarily increase the cost.

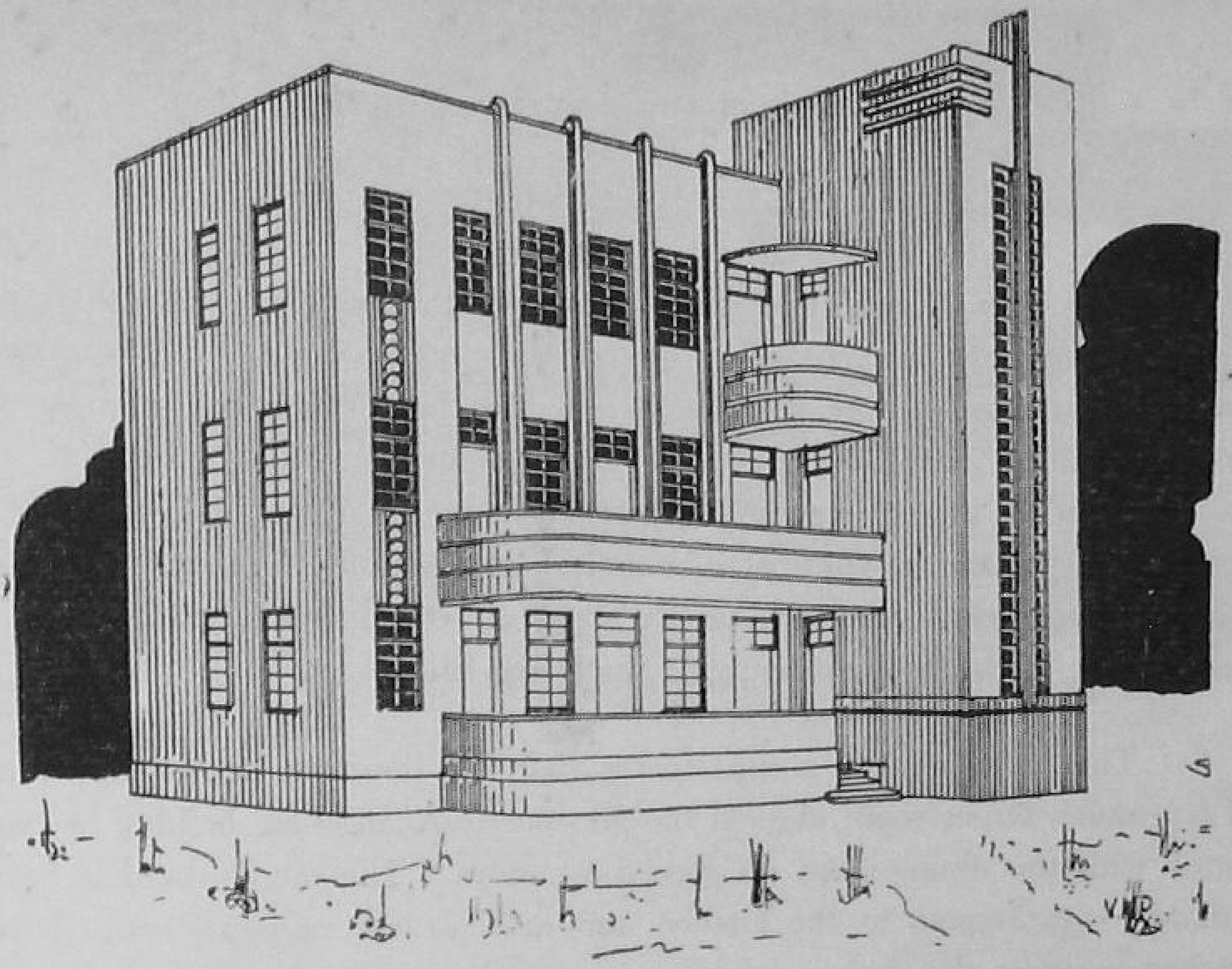


Fig. 99

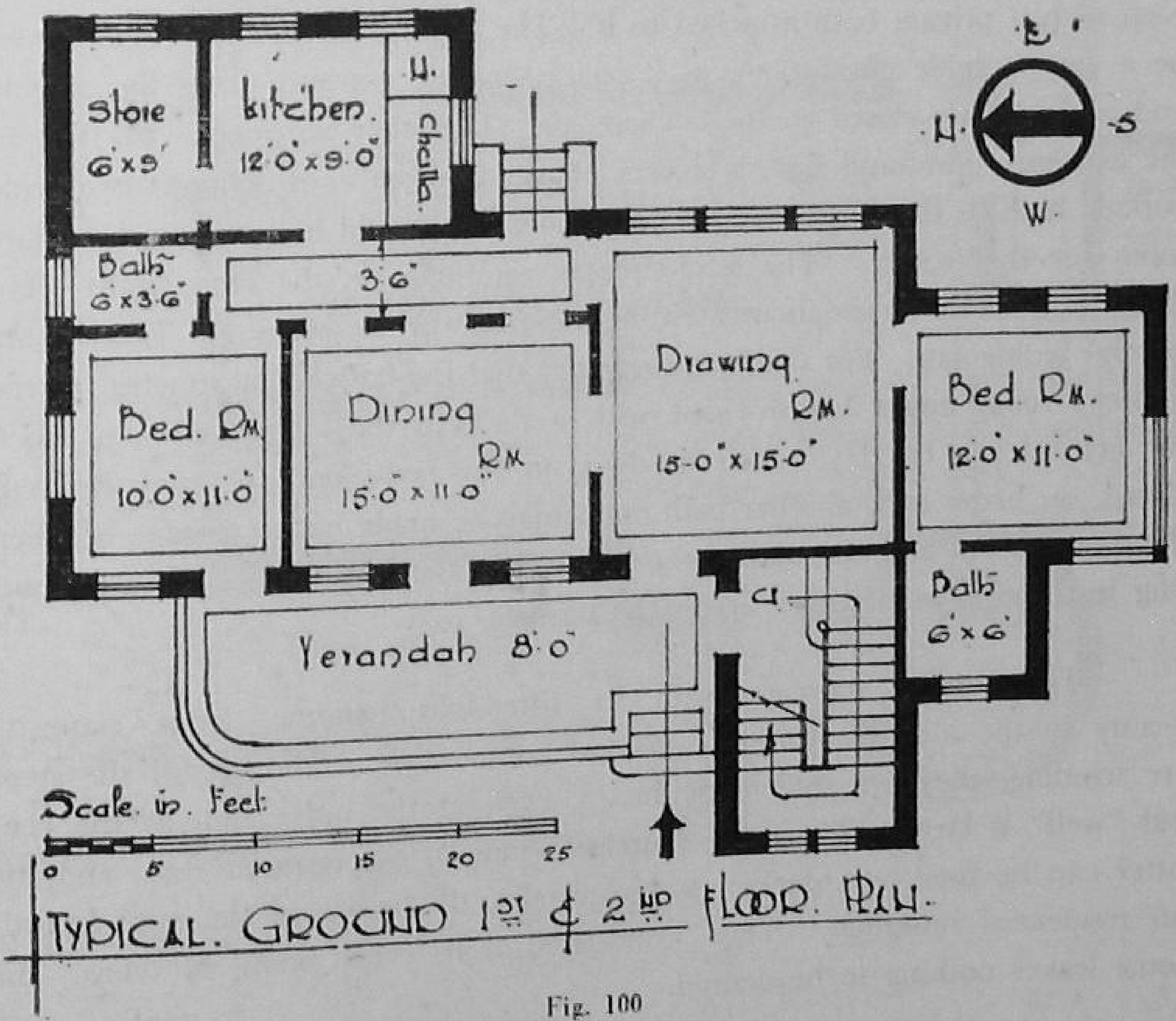


Fig. 100

PLAN NO. 36

Floor Area of two storeys: 4,024 sq. ft.

Pre-War Cost: Rs. 18,750

The plan of these flats is on a more luxurious scale than the preceding design. Not only is every room larger and more spacious, but the general arrangement also is more convenient and, therefore, calculated to make for greater comfort and happiness. The verandah in front is ten feet wide and its extension on the extreme left, in particular, makes it very enjoyable. The staircase, as in the previous plan, is outside the building and on its extreme right-hand corner, so that the people going up and down it would cause no disturbance to the people occupying the lower flat.

The drawing-room is next to the staircase, the most projecting room. It is a much larger room than in the previous plan, and can, besides, be combined with the dining-room on special occasions. The dining-room is better situated with respect to the kitchen and has just the necessary size. The kitchen occupies the proper corner, viz., north-east and has a store-room connected to it in a convenient manner. There are two spacious bed-rooms, each with a private bath attached to it. The one on the left-hand side would be a very suitable guest-room, as it has a separate entrance from the outside and is completely closed on the kitchen side. The other bed-room, viz., that on the extreme right-hand side, is a very charming room as it commands a wide outlook both in the south and west directions. It would be a very appropriate room for the master. The semi-circular verandah on the rear might serve either as a work verandah or a sitting-out place in the evening. There is no general bath-room. For this it is suggested that the bath-room attached to the master's room might be provided with a door in the lobby and kept open for general use by day, when its door on the bed-room side may be kept closed, or, better still, another bath-room may be made in the passage between the dining-room and the bath-room attached to the master's bed-room by putting just one cross partition across the passage.

The circular staircase, with its three-fold window, lends exquisite beauty to the already charming general composition. Though all the steps are winding, they are sufficiently broad, even at the inner end, as the central "well" is large. The same staircase winds to the terraced roof, and the latter can be used as a deck. Architecturally, this is one of the most beautiful residential buildings. Thus, considered from every point of view, the home leaves nothing to be desired.

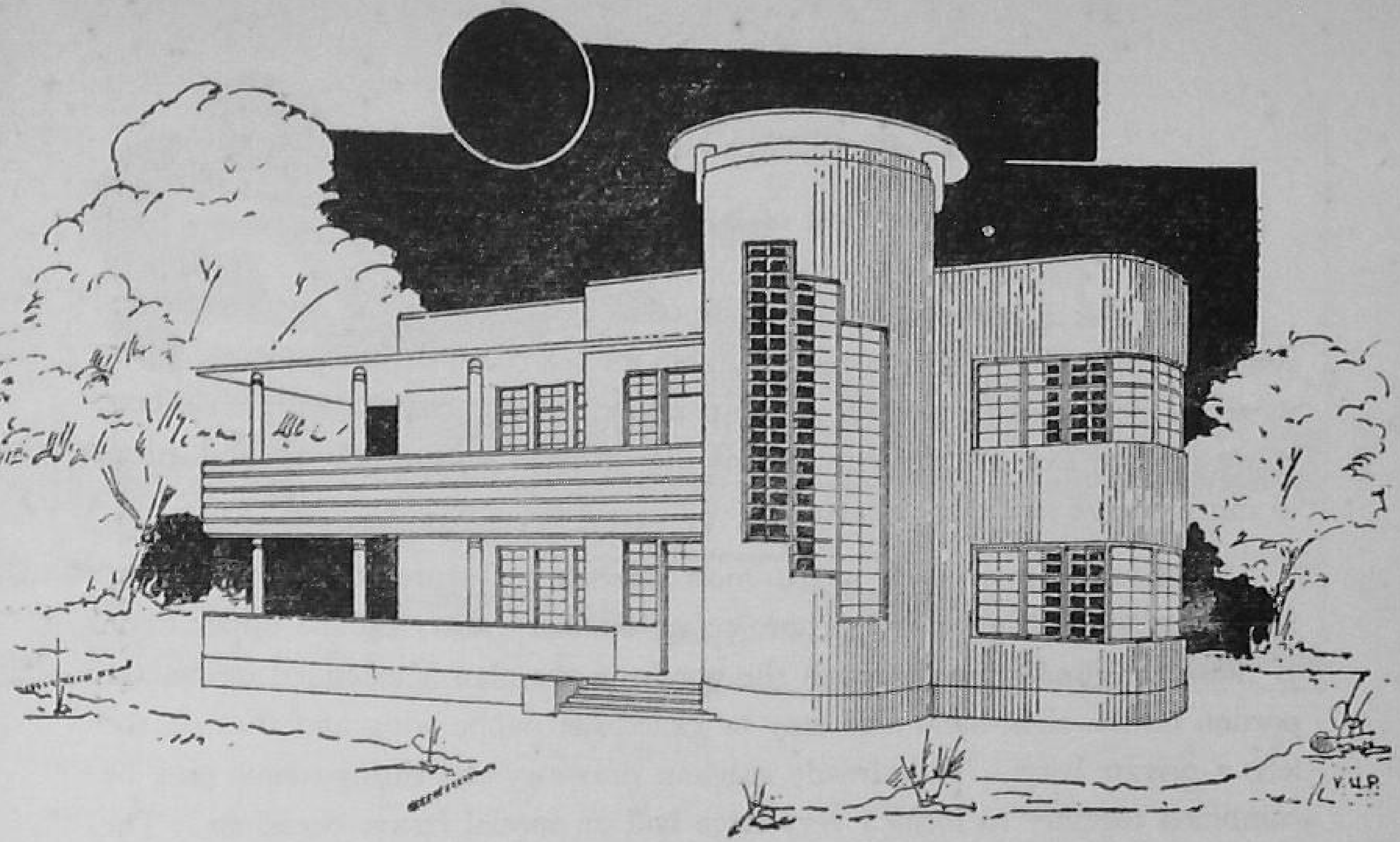


Fig. 101

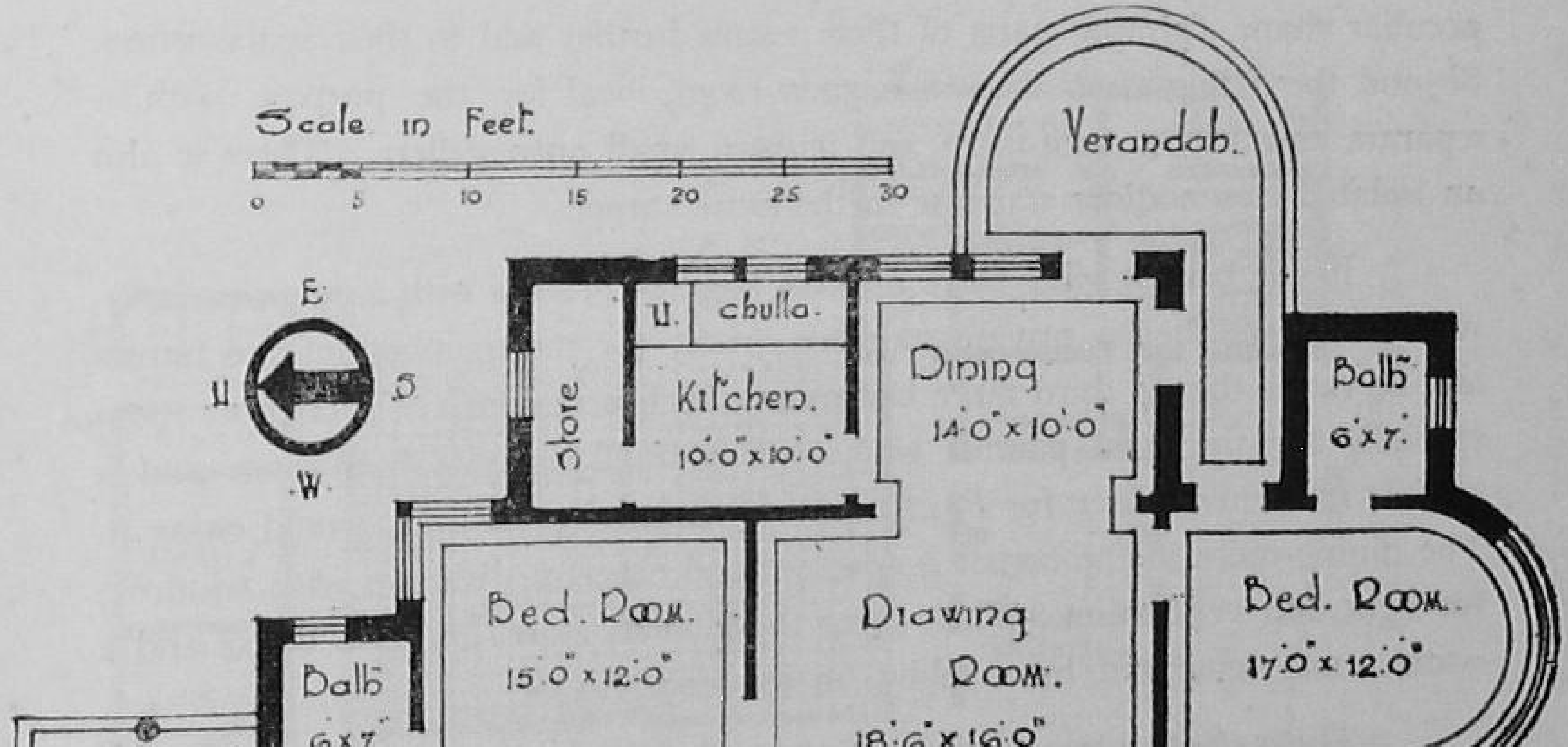


Fig. 102

PLAN NO. 37

Plinth Area: 4,850 sq. ft.

Pre-War Cost of both floors: Rs. 50,000.

THIS is a home of special distinction, designed on the open, extended system of planning, which is most suitable for sea-coast, or other places, where there are no extreme severities of temperature. A successful attempt has been made in it to expose as much area of the home to the outside air and admit as much breeze inside as possible.

The entrance porch is the most arresting feature of the building. Shelter to a car is given by the projecting circular gallery on the upper floor. If the centre line drawn through the porch on the plan is extended inside, the portion on the right-hand side may be called the public wing and that on the left, a private wing. The already spacious drawing- and sitting-rooms may be combined together to form a very large hall on special festive occasions. The verandahs on both sides, particularly that on the front which is wide and of peculiar shape, forming parts of these rooms further add to their spaciousness. Beyond the sitting-room there is a guest-room, ideal for the purpose with a separate entrance, a bath-room and its own small open gallery. There is also an isolated commodious staircase in the same corner.

In the private wing there are two large bed-rooms with a common bath-room between, then a private staircase strictly for the members of the family and servants, then a third large bed-room which is designed as a comfort room specially for the aged parents who, with a small separate bath-room and a cubicle in a quiet place for *Puja* to satisfy their religious urge, would enjoy it. The dining-room in the corner is spacious and cheerful with two wide windows for light and ventilation. Then come the kitchen, store, and two w. c.s and a water room separated by a lobby, in sequence.

The extensive paved area in the open yard would be ideal for children's play, or for out-door dining, moon-light feasts, etc. A temporary pandal erected on it by stretching wires above would make an excellent place for marriages, etc.

The small verandah provides both shelter from the sun's rays and an independent passage to every room. The two staircases make it possible to convert the upper floor into an independent flat.

The simple, streamlined exterior treatment gives the house an air of dignified domesticity and hospitality, which from the above description is an honest expression of the comforts and conveniences of the interior.

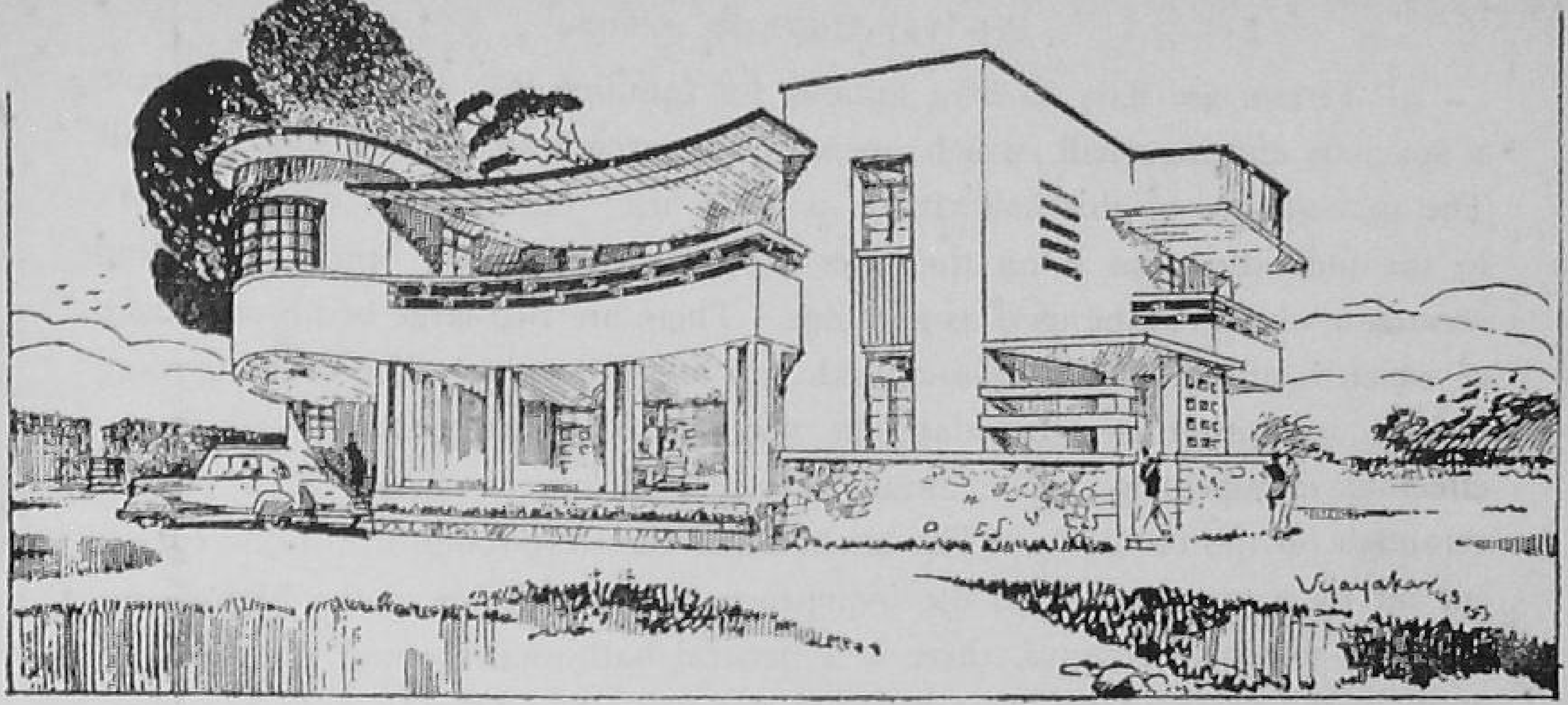


Fig. 104

Fig. 105

PLAN NO. 38

Floor Area of two storeys: 12,500 sq. ft.

Pre-War Cost: Rs. 58,000

THESE are flats *de luxe* suitable for families of a rich class. There is a spacious entrance hall, which opens by an arch into a large staircase hall. The spaciousness of this hall creates a good first impression. The entrance to the individual flat is on the sides of the entrance hall, into a spacious verandah which can be used as a lounge. There are two large bed-rooms, each of which is provided with its own bath and dressing-room. The drawing-room is large enough to accommodate the necessary furniture without causing an effect of crampedness. The dining-room is still larger. There is a service verandah on the back side. The kitchen and the store-room are in one corner cut off by a verandah from the living-rooms. In addition to the bath-rooms attached to the bed-rooms, there is a general bath-room behind the dispense room, with a sink useful for taking an Indian bath. There is a long gallery on each side with a service staircase independent for each flat for the use of servants including a sweeper. A number of clothes closets and wall-cupboards are provided. There is a large opening in the wall between the sitting-room and the dining-room, so that on special occasions both these halls can be combined together. Thus the flats provide every element of a comfortable living on the part of a high-class family.

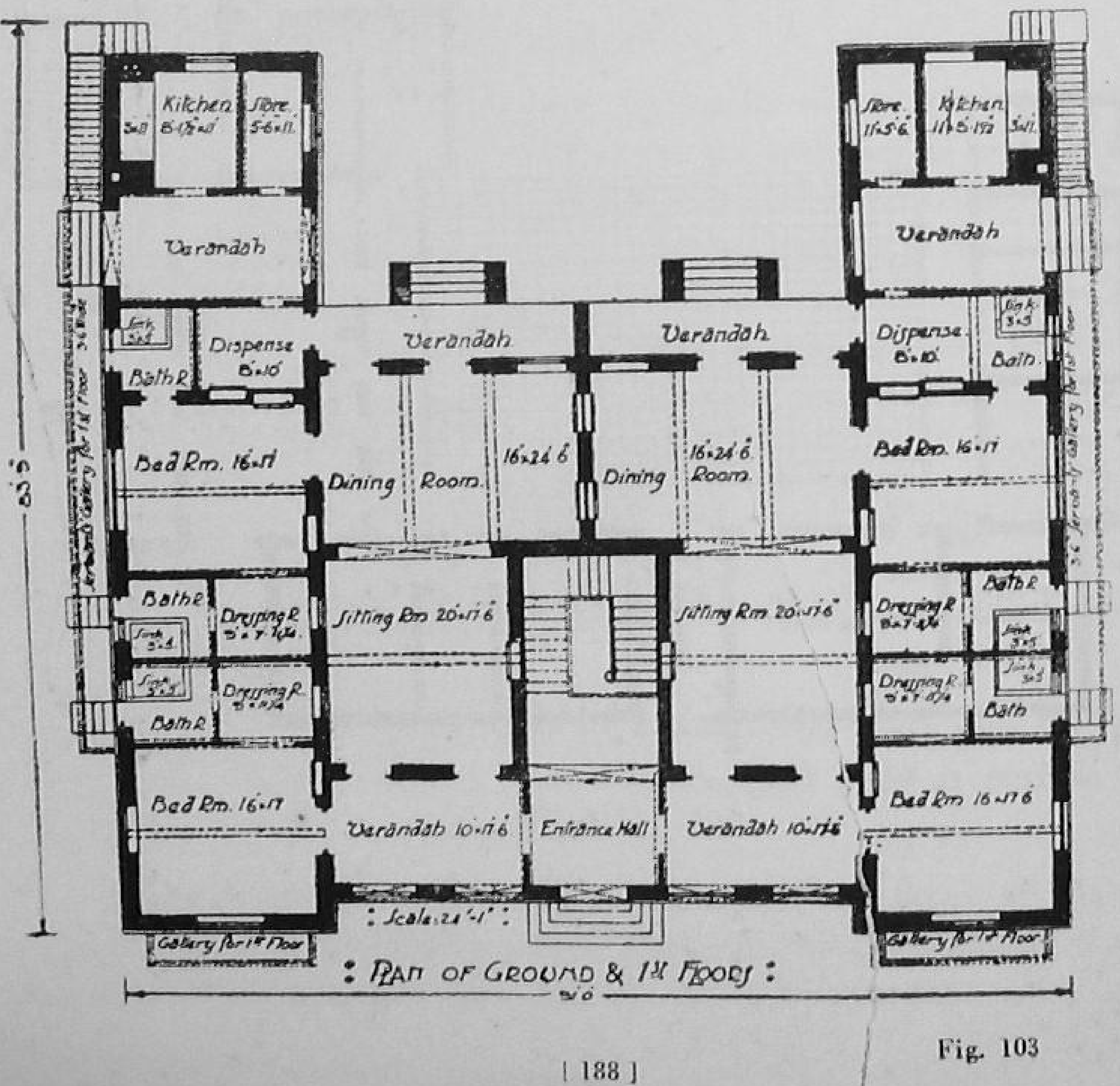


Fig. 103

INDEPENDENT COTTAGE HOMES

PLAN NO. 39

Plinth Area: 1,380 sq. ft.

Pre-War Cost: Rs. 4,500

THIS is a compact plan of nicely arranged rooms suited for a building plot facing north. The elevation also is modern and artistic. The special feature of the plan lies in the fact that every inch of the space is utilised, the only area occupied by a lobby is that of a few square feet in front of the bath-room, and yet every room is independently approachable. The bath-room is so situated that it can be reached independently from any room.

There is a small verandah in front; if funds permit, it may be made 7′ 6″ wide, at least, so that it would function better as a verandah for all its legitimate uses. It would be well if an access to the dining-room could be provided from the verandah by the provision of a door just in front of the entrance steps. The drawing-hall of 12′ × 17′ is indeed a luxury for such a small cottage. There are three bed-rooms including the ladies' room, all of adequate size. There are clothes closets of ample size provided in two bed-rooms, and one extra near the bath-room in the lobby. A closet for keeping clothes of daily homewear, after they are washed and dried every day, is very handy near the general bath-room in the home of a middle class family. The store-room of just sufficient size for the typical small cottage is conveniently placed near the kitchen. A back entrance to the kitchen is a necessity and has been provided. The dining-room with two double windows in two walls is spacious enough. As the cottage is designed for an up-country town, no sanitary closet is provided inside.

The outer walls are of brick in lime, 14 inches thick, plastered also on the outside, and all inner ones are partitions six inches thick, including plaster on both sides. There is an R. C. C. canopy over the front verandah which is over-hanging from the wall and has no supports at the outer end.

The plan, as it is, might also suit a western aspect.

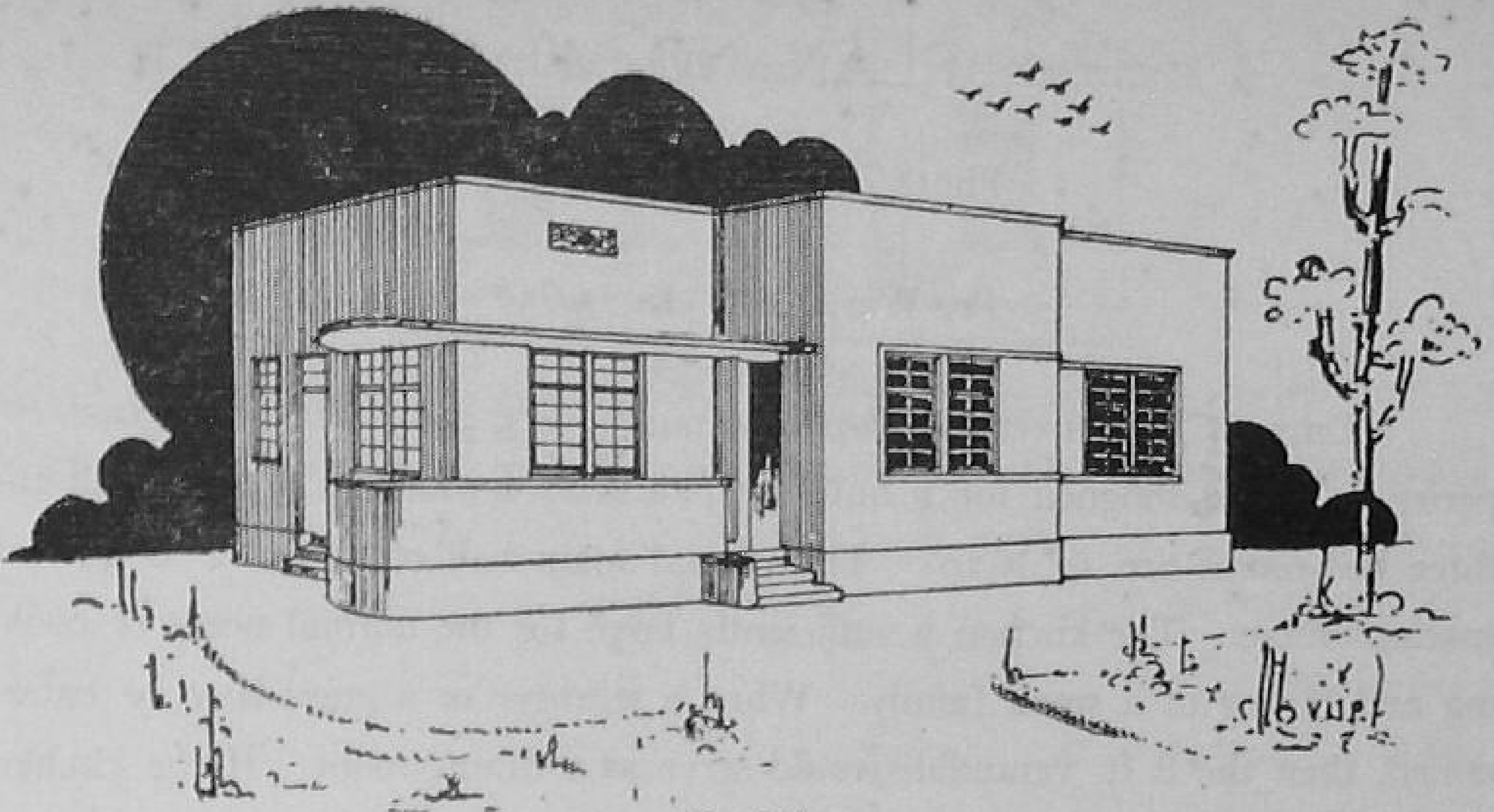


Fig. 106

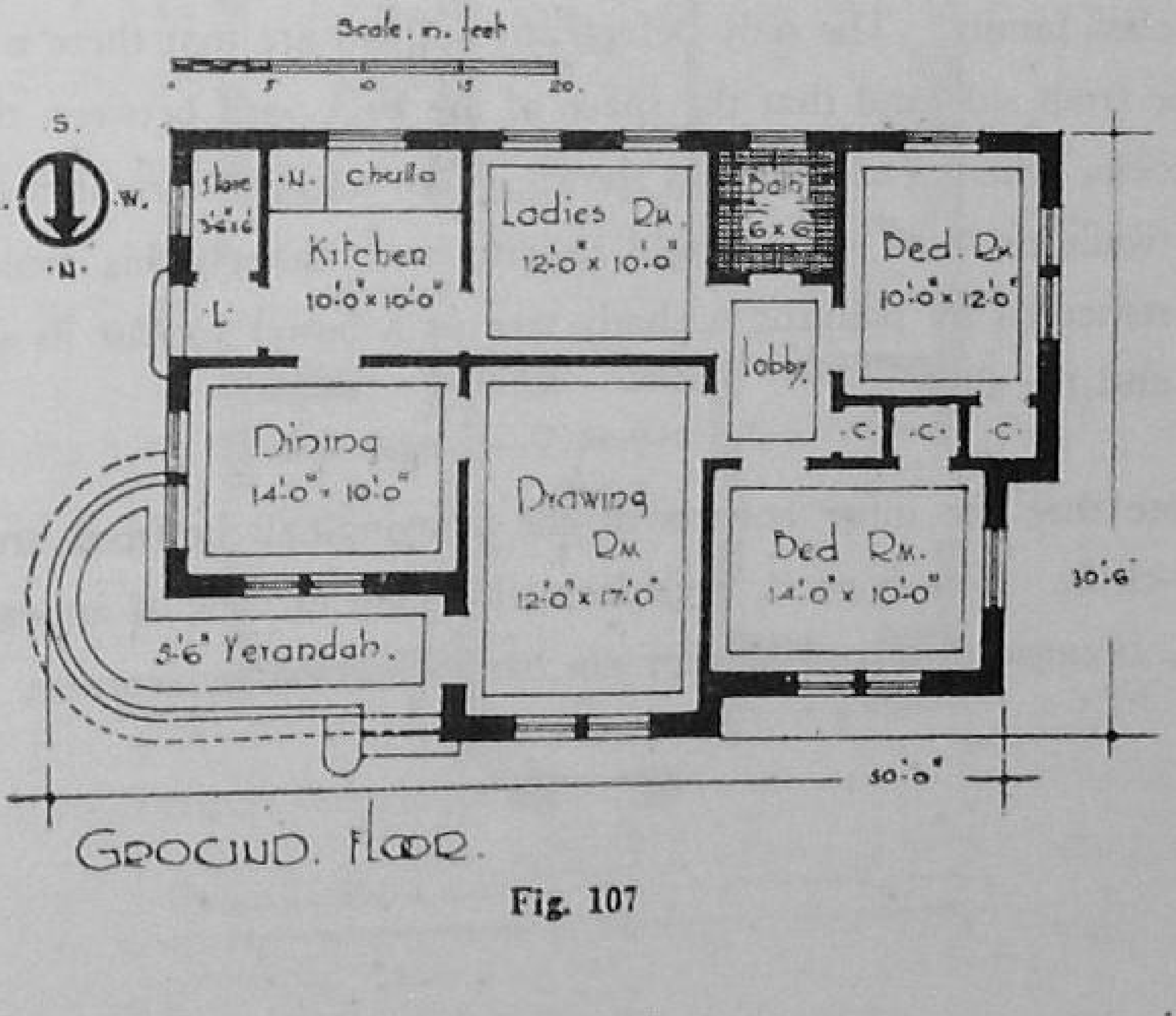


Fig. 107

PLAN NO. 40

Plinth Area: 1,550 sq. ft.

Pre-War Cost: Rs. 5,650

THIS is a conventional plan, found very convenient by actual experience. It is designed for a building plot with a southern aspect. All the three bed-rooms are 12′ × 10′. The central main hall of 19′ × 12′ is quite a spacious room. The kitchen is sufficiently large for the normal needs of cooking and dining of a small family. When a stranger or a guest is to be entertained, then the 8 ft. verandah would serve as a dining-room. If the kitchen were oblong, instead of square, it would have been better. The store-room adjacent to the kitchen is very convenient. The bath-room, w. c., and wash-room occupy just the proper corner and are separated by a lobby.

If, in course of time, a floor is to be added on the top of the ground floor, a convenient location for the staircase would be in the verandah between the two bed-rooms on the west side. Thus the cottage is very convenient for a middle class family. The only defects in the plan are that there is no verandah on the front side and that the space of the back-yard between the kitchen and bed-room, where *Tulsi* plant is shown, is too narrow to remain cool, when the stone walls on both sides would radiate heat, though this could be considerably remedied by planting a shady tree or a bower to cast its shadow on the walls and the floor.

Note that the inner corners of the drawing-hall in front are rounded by a semi-circle. This is good, both from the point of view of appearance and sanitation, because dust and vermin are likely to collect in corners, otherwise.

Fig. 108

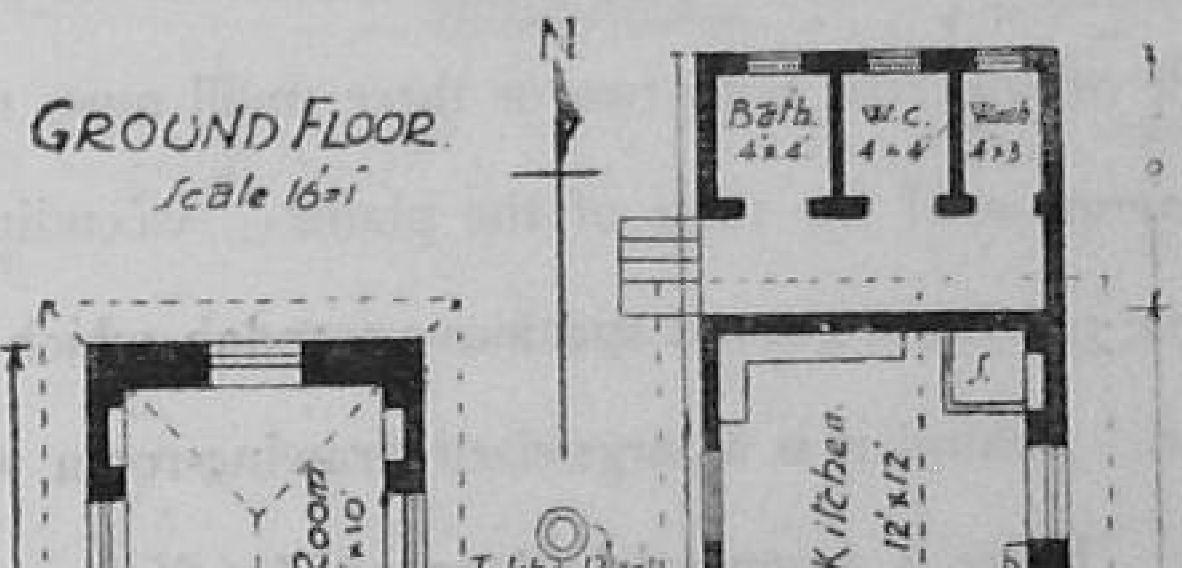


Fig. 109

PLAN NO. 41

Plinth Area: 1,585 sq. ft.

Pre-War Cost: Rs. 6,000

THIS is a modern design planned for economy, beauty, and comfort, most suitable for a corner plot facing north or north-west. It comprises three bed-rooms, including the office room, a drawing-room, kitchen, dining and store-room, a verandah and two bath-rooms, and thus provides all the necessary accommodation demanded by a middle-class family of five or six members. The building would look well if erected on an elevation, such as a small hill-top, commanding the view of the surrounding country.

Just at the main entrance there are curved flower-boxes on either side. These are made of concrete, with two or three small pipes near the bottom for drainage and aeration of the roots of the plants. Ascending the flight of entrance steps, one reaches a curved spacious verandah which adds to the beauty of the elevation. Behind it is a large-sized drawing-room which would indeed prove a luxury. There is a general bath-room 9′ × 6′, centrally situated. The kitchen and the dining-room are both of adequate size and grouped together in the best possible manner. The store-room is a little away and separated by the back entrance passage, which is done at a little sacrifice of convenience to obtain a symmetrical effect. However, the inconvenience is trifling. There is another bath-room attached to the bed-rooms for common use. A private bath-room attached to a bed-room is a luxury, though it is gradually becoming a modern necessity. There is the usual back entrance. There are two clothes closets provided. The special feature of the design is the corner windows provided in the office and the front bed-room. If the sills of such windows are made low and seats are provided on them, they are very enjoyable to sit in comfort and look at the fresh flowers and foliage in the garden. The elevation is very attractive, though quite simple, both in concept and construction. The cottage would be also very suitable as a sea-side resort facing the sea.

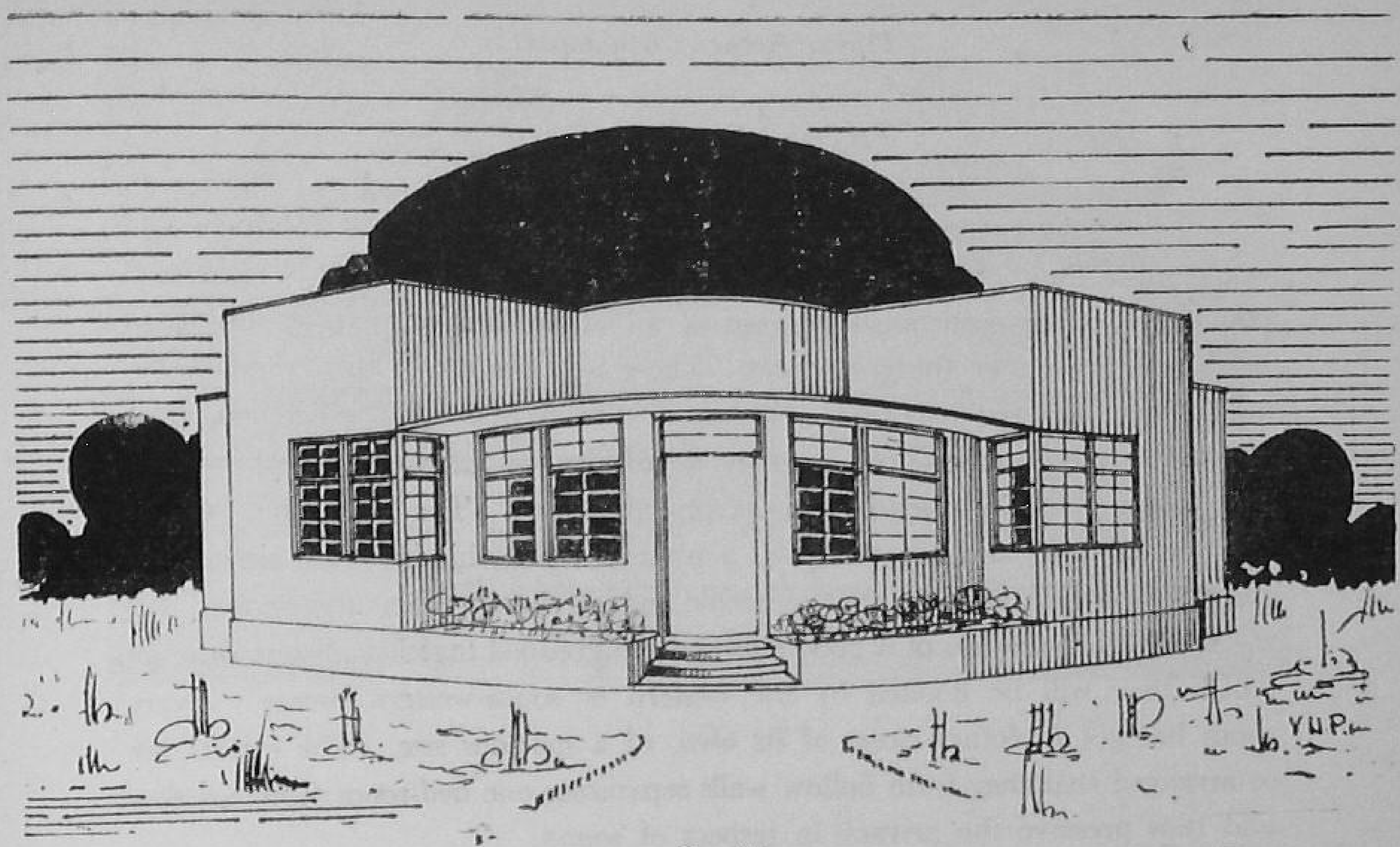


Fig. 110

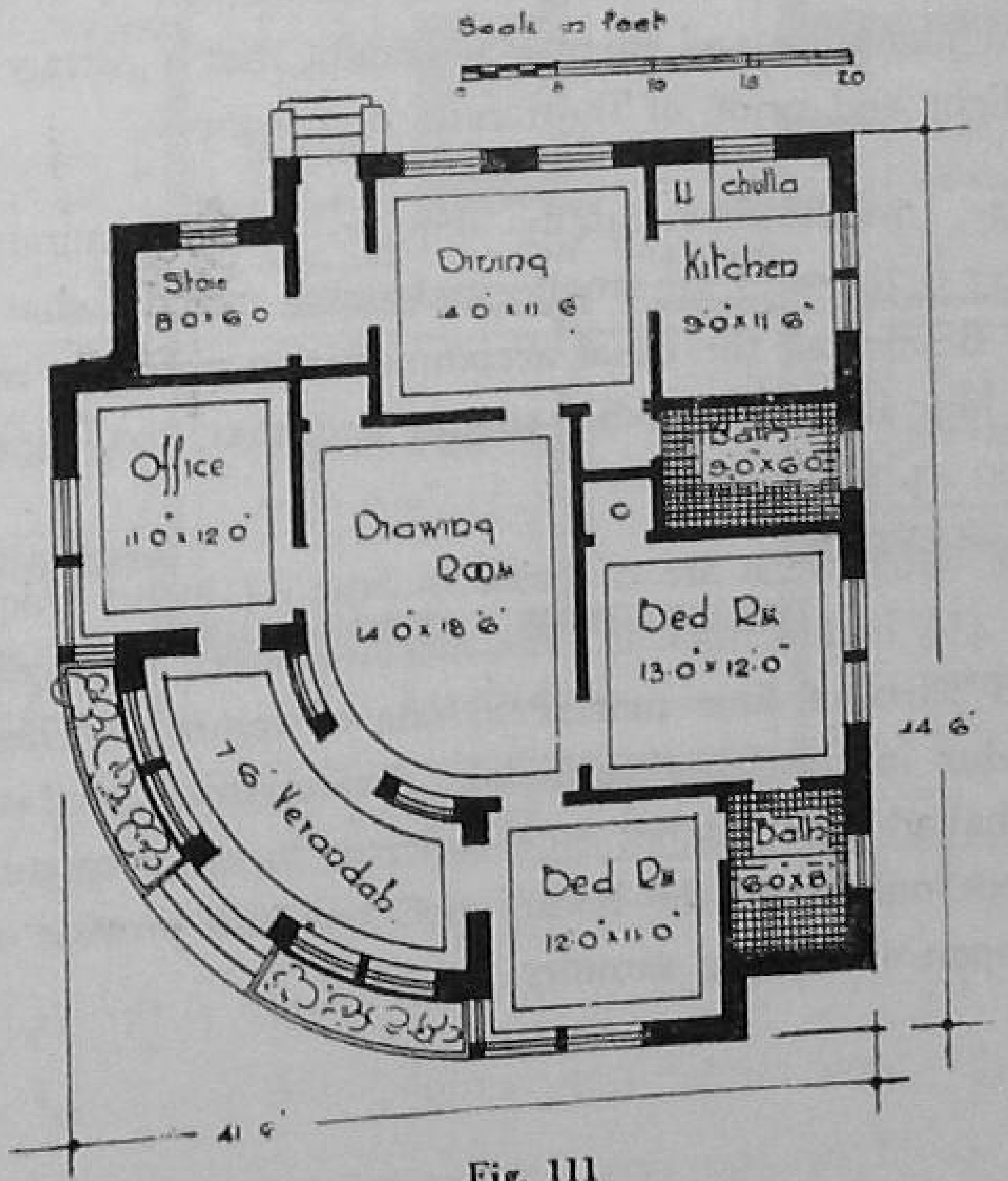


Fig. 111

PLAN NO. 42

Plinth Area: 1,874 sq. ft.

Pre-War Cost: Rs. 6,750

THIS design represents utility, simplicity and all modern comforts, and would suit a family whose motto is plain, unostentatious living. It is a compact plan with square corners and devoid of all ornamentation. It would suit a north, north-west, or western aspect. There is in front a 7 ft. verandah, behind which is a spacious and well-shaped drawing-room. The kitchen, store and dining-room are grouped together in an ideal manner. A work verandah near kitchen is very essential and is provided here. The bath-room is very centrally situated and occupies such a place that it is hidden from sight from the drawing-room and is still accessible independently from any room. All the four bed-rooms are of a good size and are grouped together on one side, on which they will be flooded by the western or south-western breeze. Every room has got a clothes closet of its own, of a spacious size. The closets are so arranged that they form hollow walls separating one bed-room from another and thus preserve the privacy in respect of sound.

Every room has a minimum of two windows; there is very little space wasted in passages, and yet, every living room has an independent access. Thus the cottage is one of the instances of what could be achieved in a small area by skilful planning, and there is no doubt that a cottage like this should prove the delight and pride of the family occupying it.

A large, middle-class family requires a large number of rooms—it does not matter if the sizes are small—and this is exactly what is accomplished in this plan. Besides all the usual accommodation normally required, this cottage supplies four independent bed-rooms, and that, too, in a small space of less than 1,900 sq. ft.

All the outer walls are of brick in lime 14 inches thick and the inner ones of brick 4½ inches thick in lime mortar gauged with cement in the proportion of 10 parts of lime mortar to one of cement. The flooring is of polished Tandur in the front verandah, drawing-room and the bath and of ordinary Shahabad on 3 inches lime concrete in other rooms. The terraced roof would not only keep the house cool, but also provide a large space to sleep in the open air during summer.

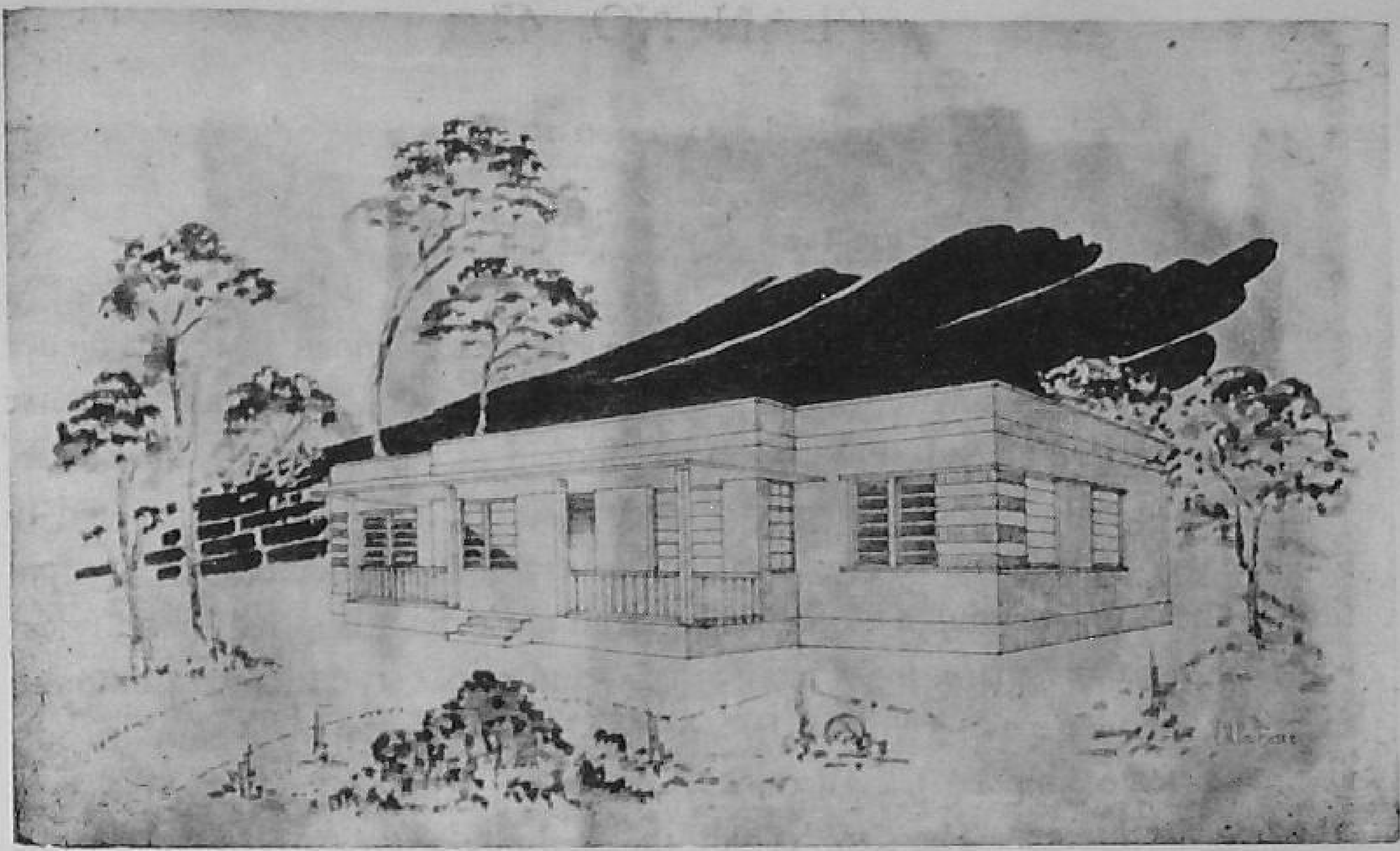


Fig. 112

Fig. 113

PLAN NO. 43

Plinth Area: 1,900 sq. ft.

Pre-War Cost: Rs. 6,800

This is a design of an artistic home, specially planned for convenience and comfort. It is suitable for a south or east facing. The main entrance in the front is at one end of the verandah, instead of one usually in the centre. The entrance at one end is more convenient as very little space is engaged in the passage, and the remaining area of the verandah is available for occupation. The front verandah extends in a semi-circle on the right-hand side, which allows more space, looks more artistic, and costs very little extra amount, since the circular part is roofed by an over-hanging canopy without an additional post to support it. All the bed-rooms are arranged on the side commanding the breeze. The sizes of all the bed-rooms are very good. The small longitudinal lobby gives an independent access to every bed-room, and also leads to the bath-room. One special feature of this design is the folding partition between the drawing- and dining-rooms. The house was designed for the family of a busy man dwelling on the outskirts of a large commercial city. In the family of such a man a large dining-room is required only on special occasions or perhaps on Sundays and other holidays, when all the members of the family might sit together and dine. Hence, for the sake of economy, the drawing-hall proper is reduced and is combined with the dining-room by providing a folding partition. Thus for a dinner party or for special, social or religious congregations, one large hall of 16 ft. by 23 ft. would be easily available.

Another special feature is the pantry between the dining-room and kitchen. Both the kitchen and store-room are spacious enough. There is only one bath-room, but it is located at a convenient place so that it is easily accessible both from the bed-rooms and other living-rooms. As the house was designed for a large city, a water closet is provided beyond the store, approached by a small corridor. There are double windows provided in all the rooms except the small ones, such as the bath, pantry and store. Excepting the curved verandah, all the corners are square and the entire design is based on principles of economy and common sense. The elevation is as simple as possible and yet attractive.

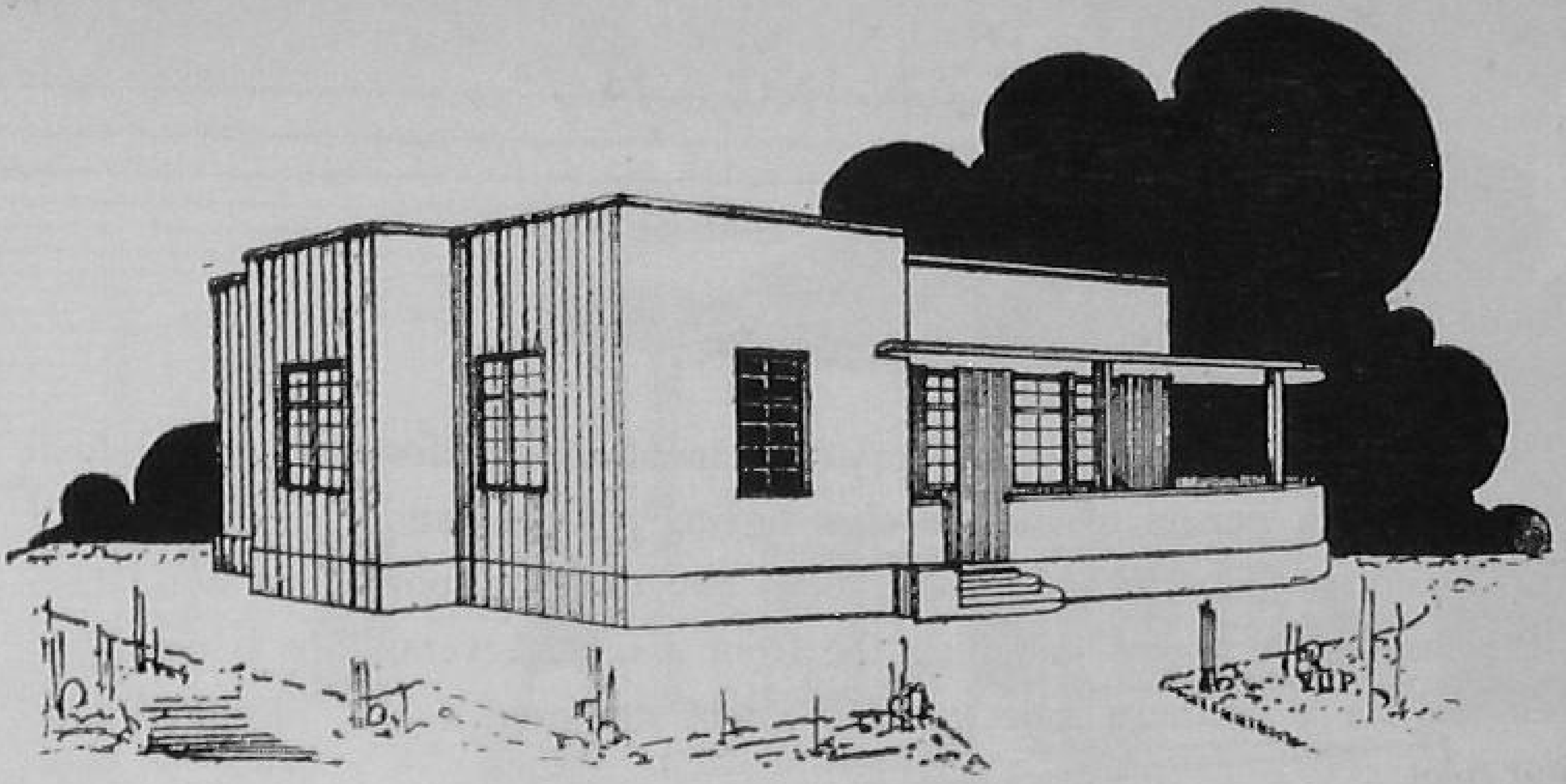


Fig. 114

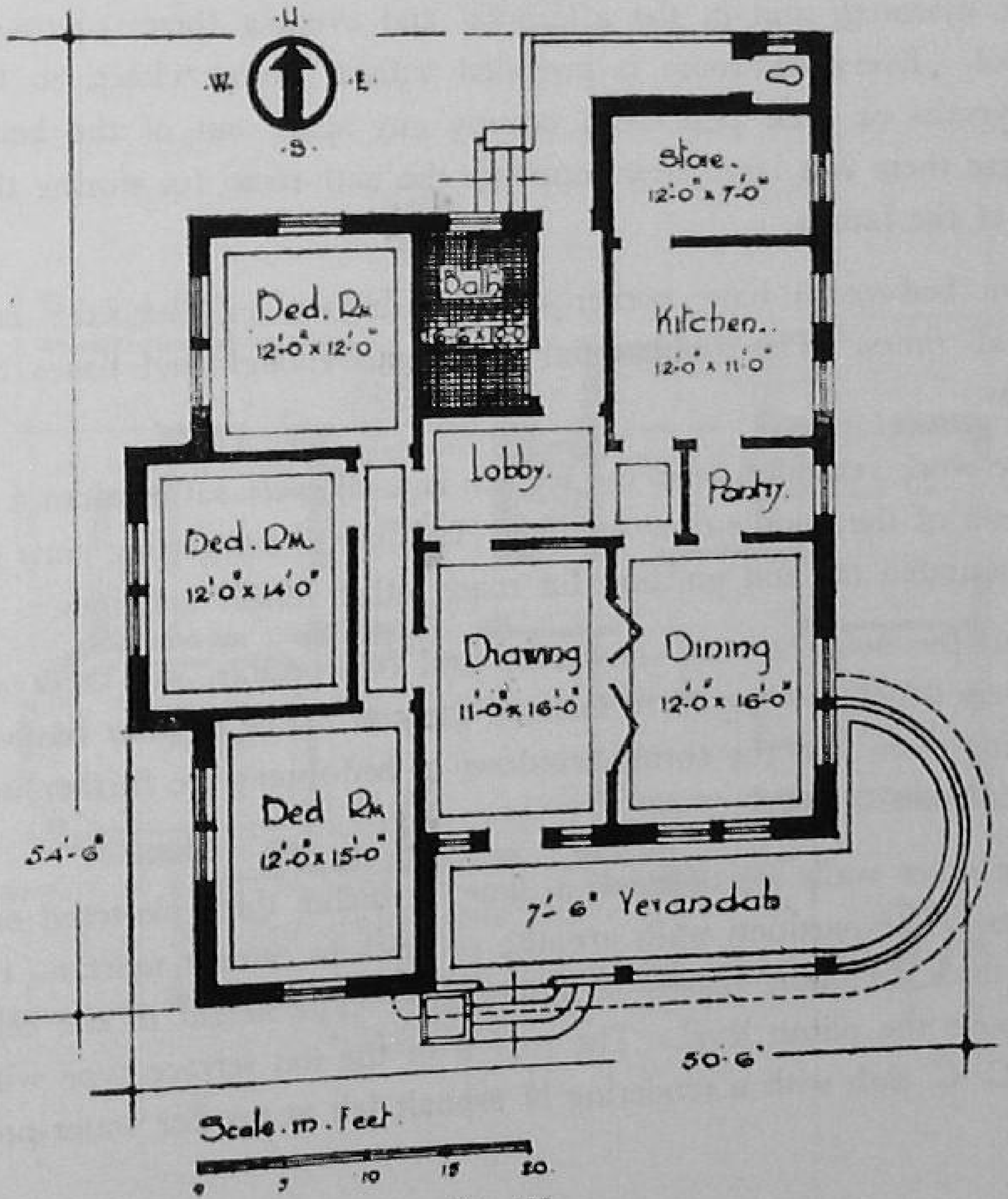


Fig. 115

PLAN NO. 44

Plinth Area: 1,900 sq. ft.

Pre-War Cost: Rs. 7,000

THIS is another design of a very convenient and comfortable home which will appeal to a person of middle class having a large family. The sizes of rooms, except perhaps those of the dining- and drawing-rooms, are not large, but the number of rooms including the front and back verandahs is nine. It is designed for a northern aspect, still it might suit even a west or north-west facing plot.

The bed-rooms are arranged on the side of the prevailing direction of breeze, and service rooms, such as kitchen and dining, on the east, so that the kitchen odours and smoke may be kept out. Another advantage of this is that the kitchen and dining-room would get plenty of pleasant and cheerful sun in the morning, and in the afternoon and evening these rooms would remain cool. Every bed-room is provided with a clothes closet, so that no extra almyrrahs or even pegs need occupy any space out of the bed-room. Besides these there is a large closet opposite the bath-room for storing the general linen of the family.

Two bed-rooms have corner double windows in two sides ensuring breeze at all times. The dining-room is spacious enough and has a circular bay-window.

The work verandah near the kitchen is a necessity rather than a luxury in the houses of the middle-class families. It is useful for getting corn ground or spices pounded off and on, and for many other family activities.

Thus the house is very convenient and comfortable, still there are too many corners which are bound to increase the cost. The circular bay-window in the dining-room and the corner windows in bed-rooms are further items to increase the cost.

The outer walls are of brick in lime 14 inches thick plastered on both the surfaces. The partition walls are also of brick in cement mortar (1 to 6) six inches thick including plaster on either side. The height of the ceiling is ten feet above the plinth level. The roof is of the flat terrace type with 4½ inches R. C. C. slab with a rendering of asphalt felt at top for water-proofing.

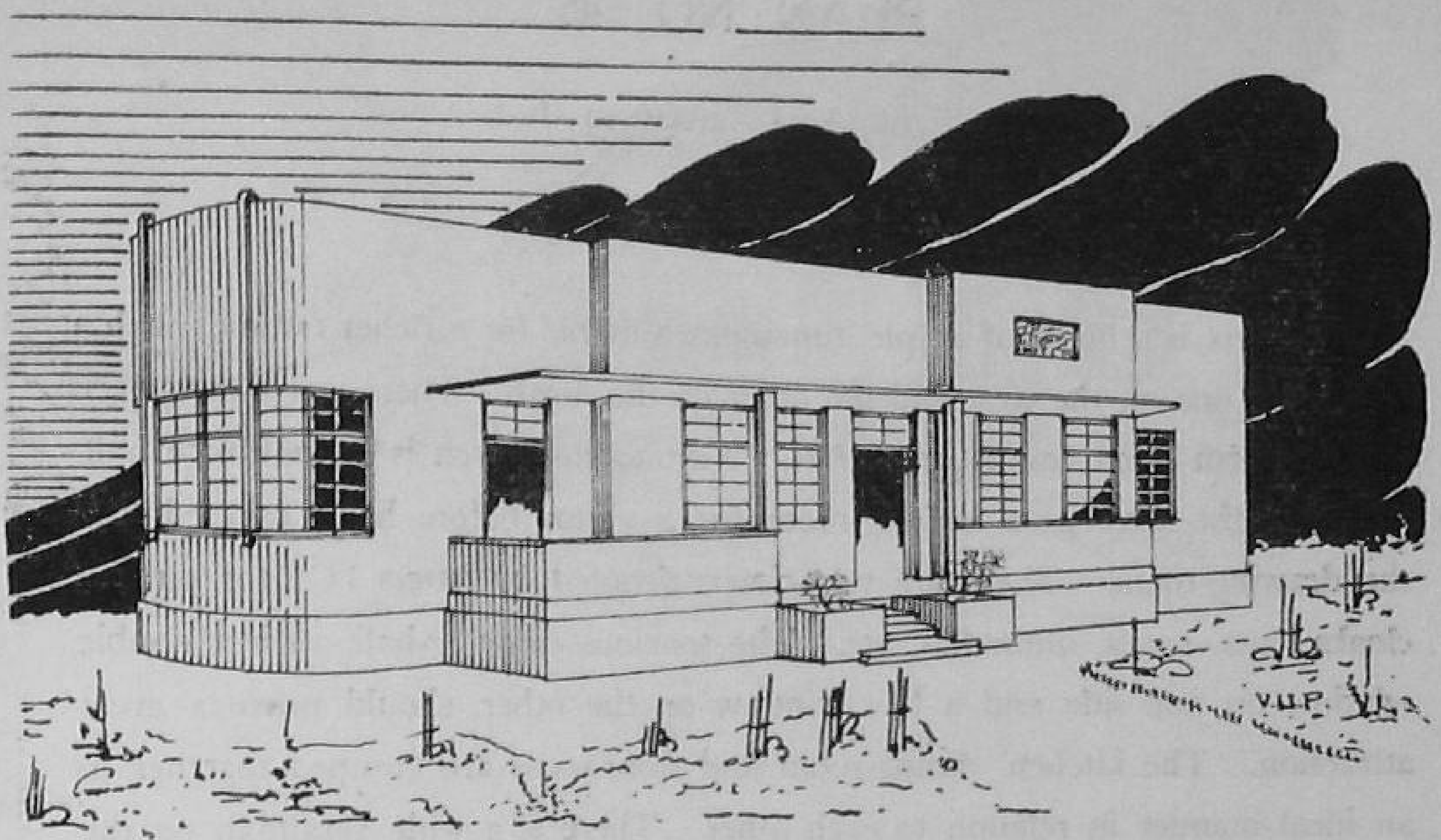


Fig. 116

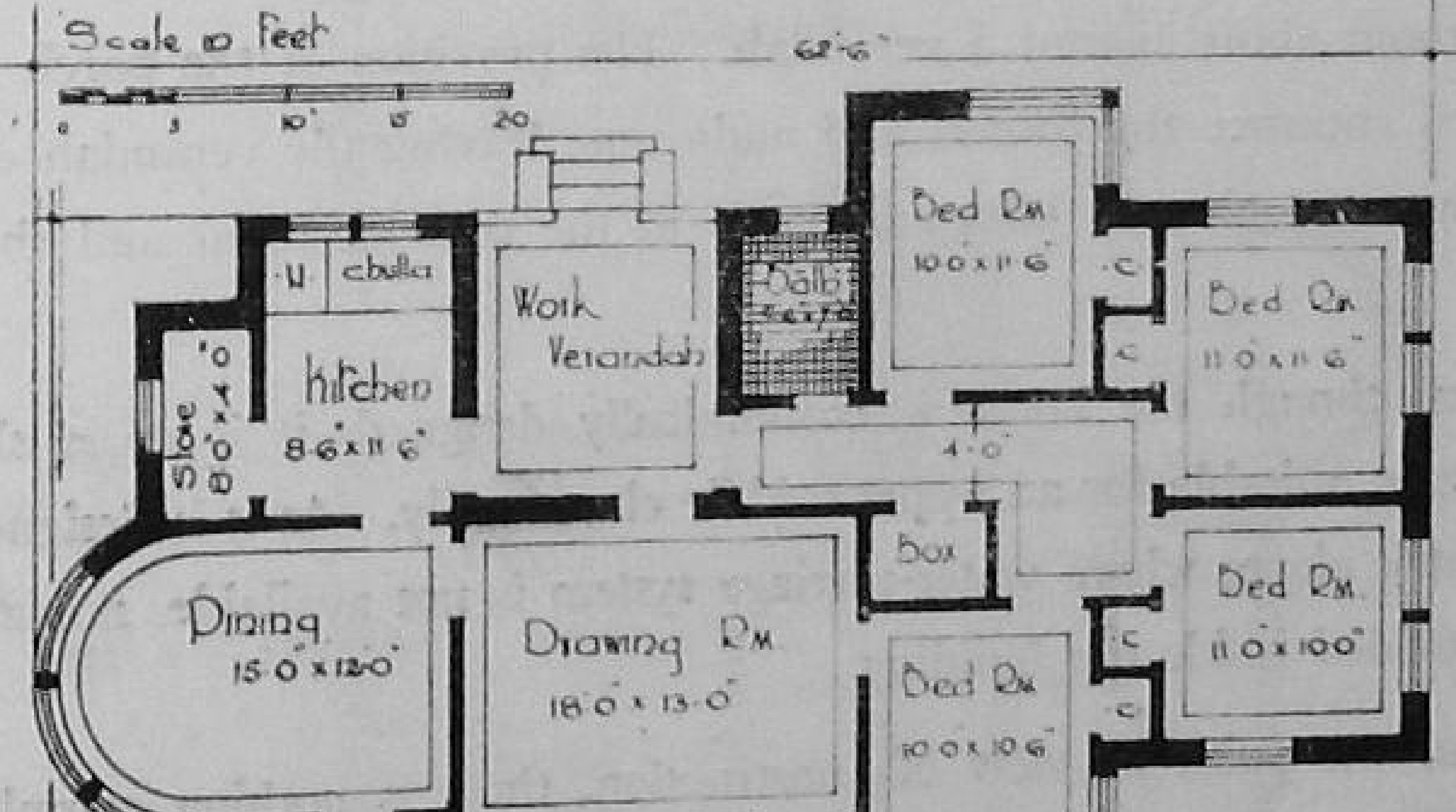


Fig. 117

PLAN NO. 45

Plinth Area: 2,091 sq. ft.

Pre-War Cost: Rs. 7,650

THIS is a home of ample dimensions suitable for a richer family. It has two faces, one on the west and the other on the north. There is a small porch on the north front for a car to rest. Next to the porch is an entrance hall, which might serve as a waiting-room for a visitor before he is ushered into the drawing-room. There are two closets denoted by letters "C" for putting cloaks, hats, canes, umbrellas, etc. The spacious drawing-hall, with a double window on one side and a bay window on the other, should prove a great attraction. The kitchen, dining-room and store-room are grouped together in an ideal manner in relation to each other. There is a wide verandah on the rear side which would make a very good sleep-out place. There is only one bath-room, but it is large enough and so conveniently located that it is accessible independently from any room of the house. All the three bed-rooms are of a very good size and command the best orientation possible. There are large clothes closets provided in bed-rooms. Another special feature is that every bed-room abuts against a verandah. The provision of the porch makes the northern entrance the formal and main one, leaving the verandah on the west as private to give an informal access to the drawing-room and the two bed-rooms.

Thus, though the home is economically designed, it is on a slightly luxurious scale, suitable for an upper middle class family. As it is designed for an up-country place, where water-carriage system is not available, no sanitary closet is provided inside the building.

From the point of view of construction, there is nothing complicated about it. There is a terraced roof also on the porch, the latter resting on two beams supported by the four pillars. The roof slab on the top of the verandah on the west is partly overhanging and partly supported on the R. C. C. pillars on either side of the steps.

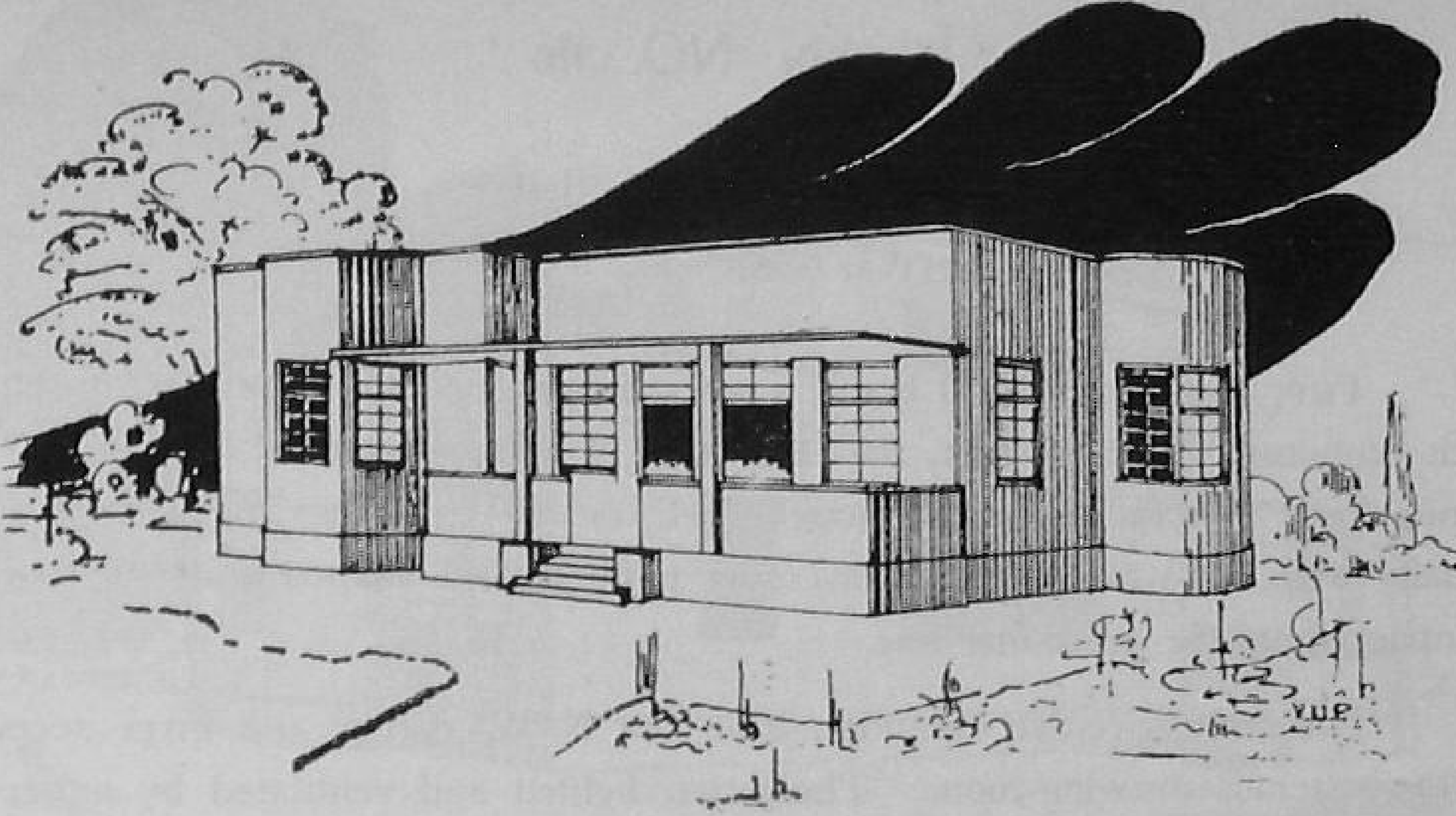


Fig. 118

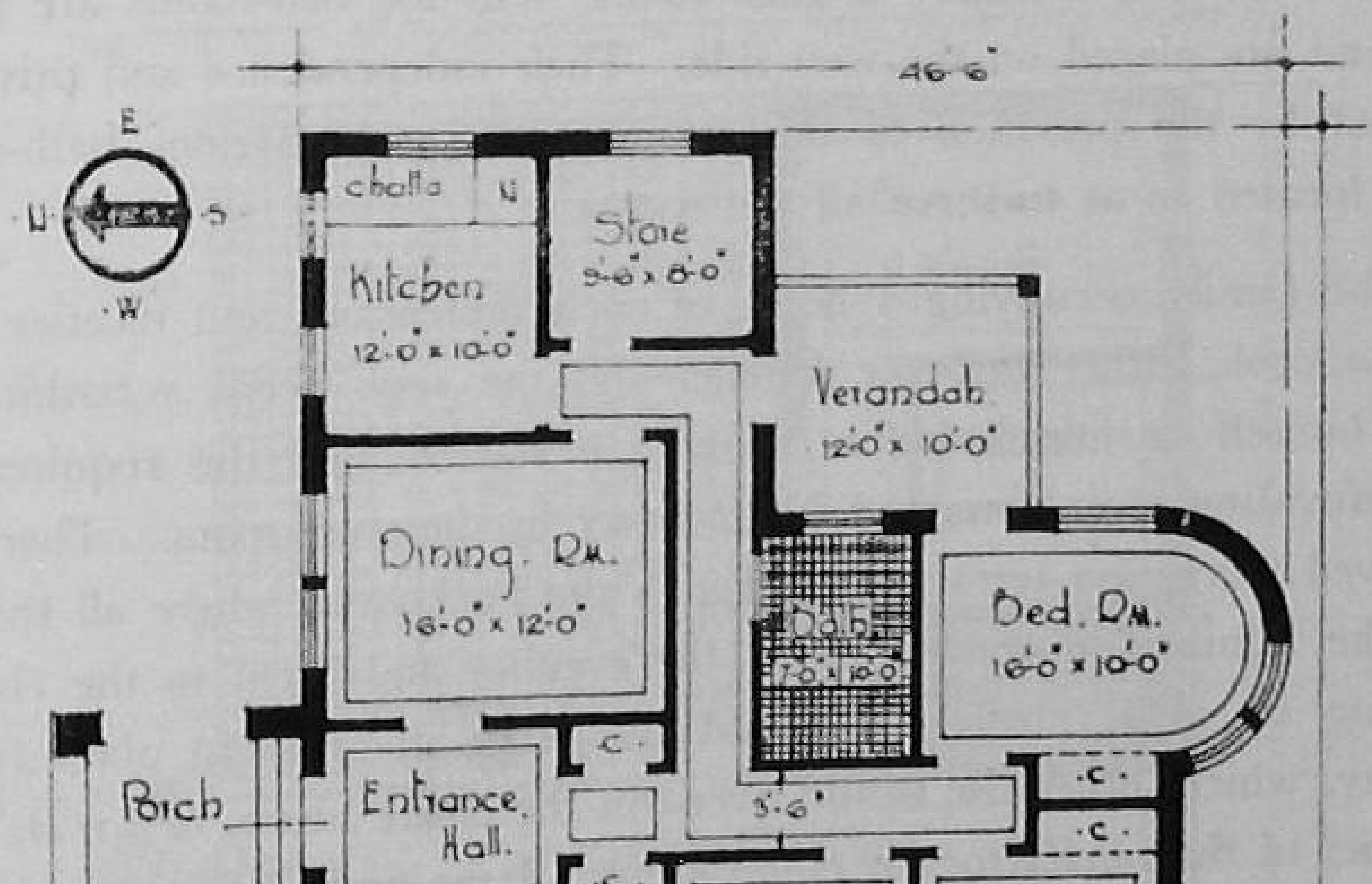


Fig. 119

PLAN NO. 46

Plinth Area: 2,054 sq. ft.

Pre-War Cost: Rs. 8,050

THIS plan of an ideal home is specially designed for comfort consistent with economy. It is, in fact, the perfection of a home personified. It is designed for a plot facing north, though N.-E. or N.-W. facings would suit it equally well. It would also suit a corner plot. It is L-shaped and still more compact than the preceding one.

The front circular verandah is in the N.-W. corner and gives access to the spacious drawing-room. The latter, lighted and ventilated by a very wide double window on the north side and protected by the verandah on the west, is sure to remain cool throughout the day and night. The large room behind the drawing-room is in fact a ladies' sitting-room. The kitchen and store have got the right place in the N.-E. corner. The dining-room is a luxury, because it is virtually a glass room. All the bed-rooms are spacious enough and are placed on the west side. Their independence and privacy are maintained by the provision of the corridor. A very spacious bath-room is centrally located so as to serve all the rooms.

The family occupying a home of such dimensions and niceties usually employs a cook, either male or female, and the cook needs a bathing-place to clean himself or herself before cooking is started, and this requirement is met by providing a sink marked N (*Nhani*) in the store-room. There is a large, paved recreation terrace provided in the back-yard, where all the members of the family can congregate in the evening and listen to the children's story-telling or girls' music. It would also serve an excellent place for children's play, which, otherwise would over-run the entire house, or for daily outdoor dinner of the family, or for entertaining a large party on festive occasions, like wedding or birthday celebrations. The southernmost bed-room is ventilated on three sides and, being spacious enough, would prove a veritable paradise for the head of the family.

The 12 ft. wide verandah in front would serve an excellent place for sleeping out of doors amidst the flood of breeze from the S.-W. direction. The height of ceiling of the drawing-room and the ladies' apartment behind it is raised to 14 ft. and clerestory windows provided on the north and south sides. This would further help to make these rooms cool even in the hottest season, because the lower windows may be closed entirely in the morning, as soon as it begins to grow hot, and light and ventilation obtained through the low and wide clerestory windows.

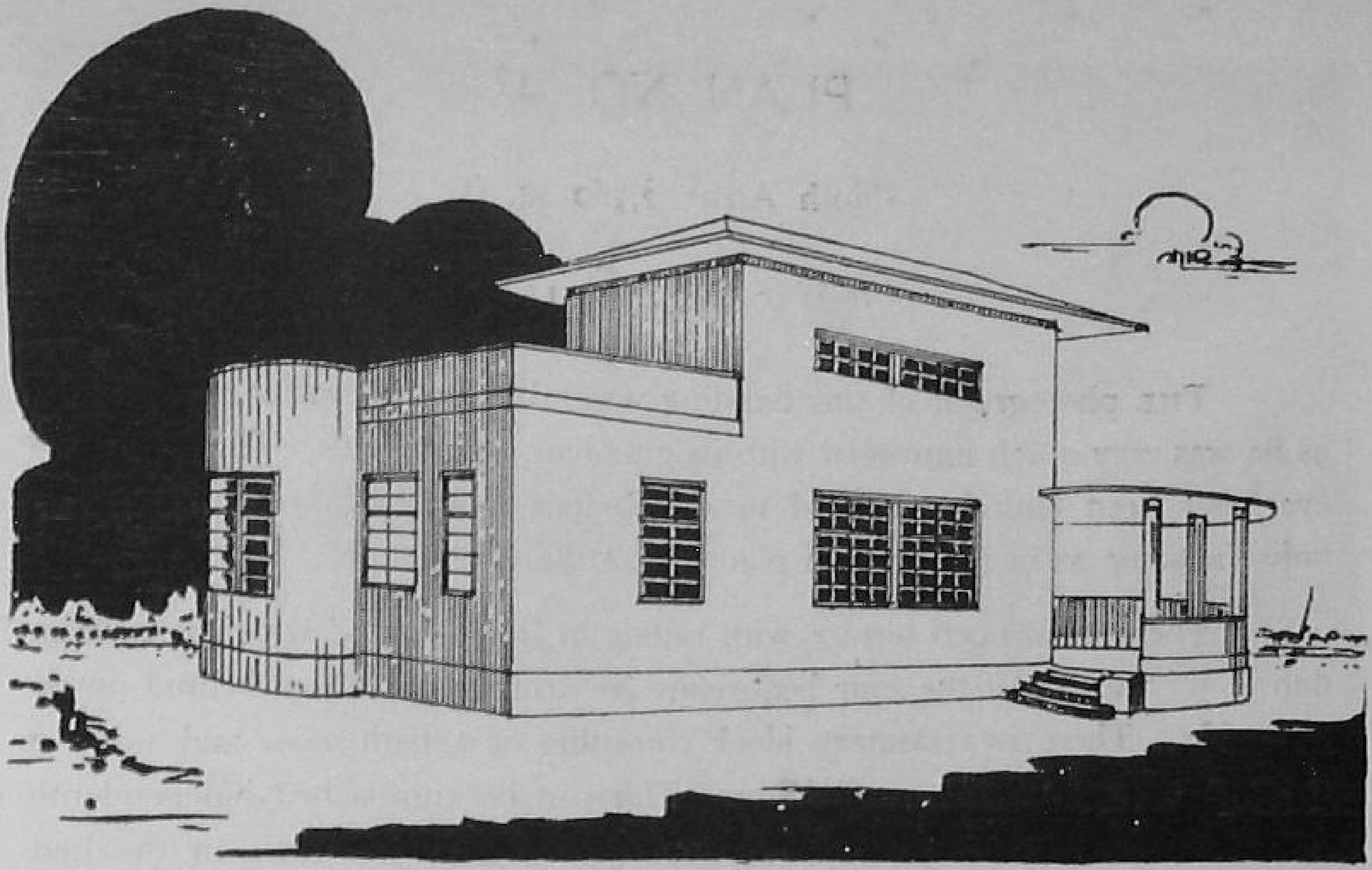


Fig. 120

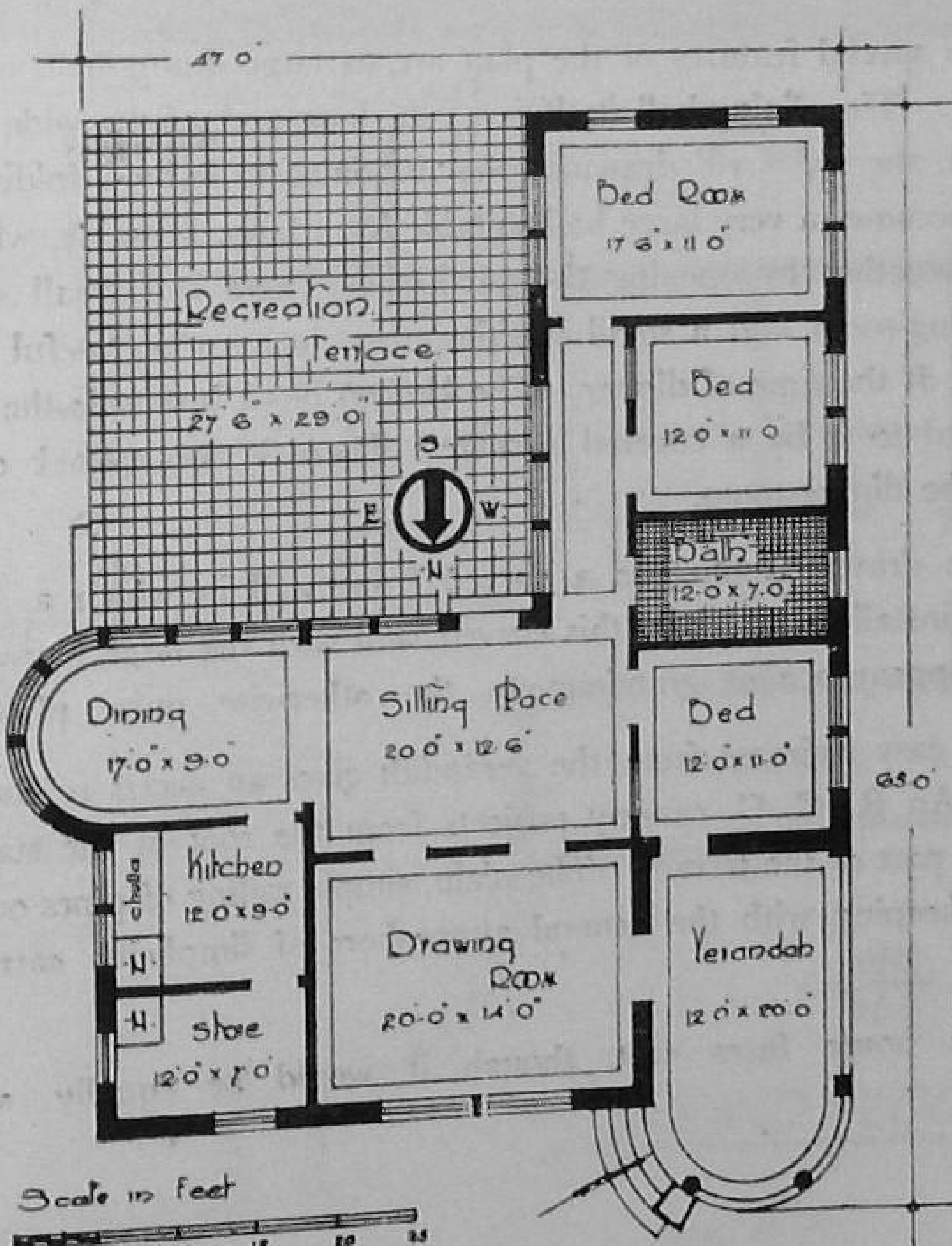


Fig. 121

PLAN NO. 47

Plinth Area: 2,760 sq. ft.

Pre-War Cost: Rs. 11,000

THE photograph of this building was taken by the writer in Germany, as he was very much impressed with its grandeur in simplicity. The plan, however, has been entirely changed to suit Indian conditions, keeping the front only the same as in the original plan to suit the photograph.

There is an open terrace with railing in front, behind which is a verandah 8′ 6″ wide. All the four bed-rooms are arranged in a row behind on the west side. There is a sanitary block consisting of a bath-room and w. c. in a corner detached by a small lobby. This can be approached independently through the verandah from every bed-room. The dotted lines in the bed-rooms show the positions of beds. The large bed-room has a double bed and a separate toilet-room of its own.

The special features of the plan are its large dining-hall and the terrace above. The dining-hall itself is 33 ft. long and 16 ft. wide and, in addition to it, the 25′ × 18′ drawing-room is joined to it by a folding partition, so that it becomes a very large hall suitable for a large assembly, when both are combined together by opening the partition. There is a small servery close to the dining-room and a small washing-place in a corner useful for washing plates, etc., at the time of dinner. The kitchen block is outside the main building attached to it by a covered passage. There is also a back entrance opposite to the dining-room.

The drawing-room has a curved front wall in which a large treble window is installed. In fact, this curved wall with the large bay-window in it gives an appearance of grandeur to the otherwise quite plain structure.

An easy staircase from the verandah gives an access to the terrace on the top. An R. C. C. canopy projects from the roof of the staircase room and covers part of the terrace. The plain, simple railing of pipes on the terrace is just in keeping with the general atmosphere of simplicity carried by the bungalow.

The house faces east, though it would be equally suitable for north-east.

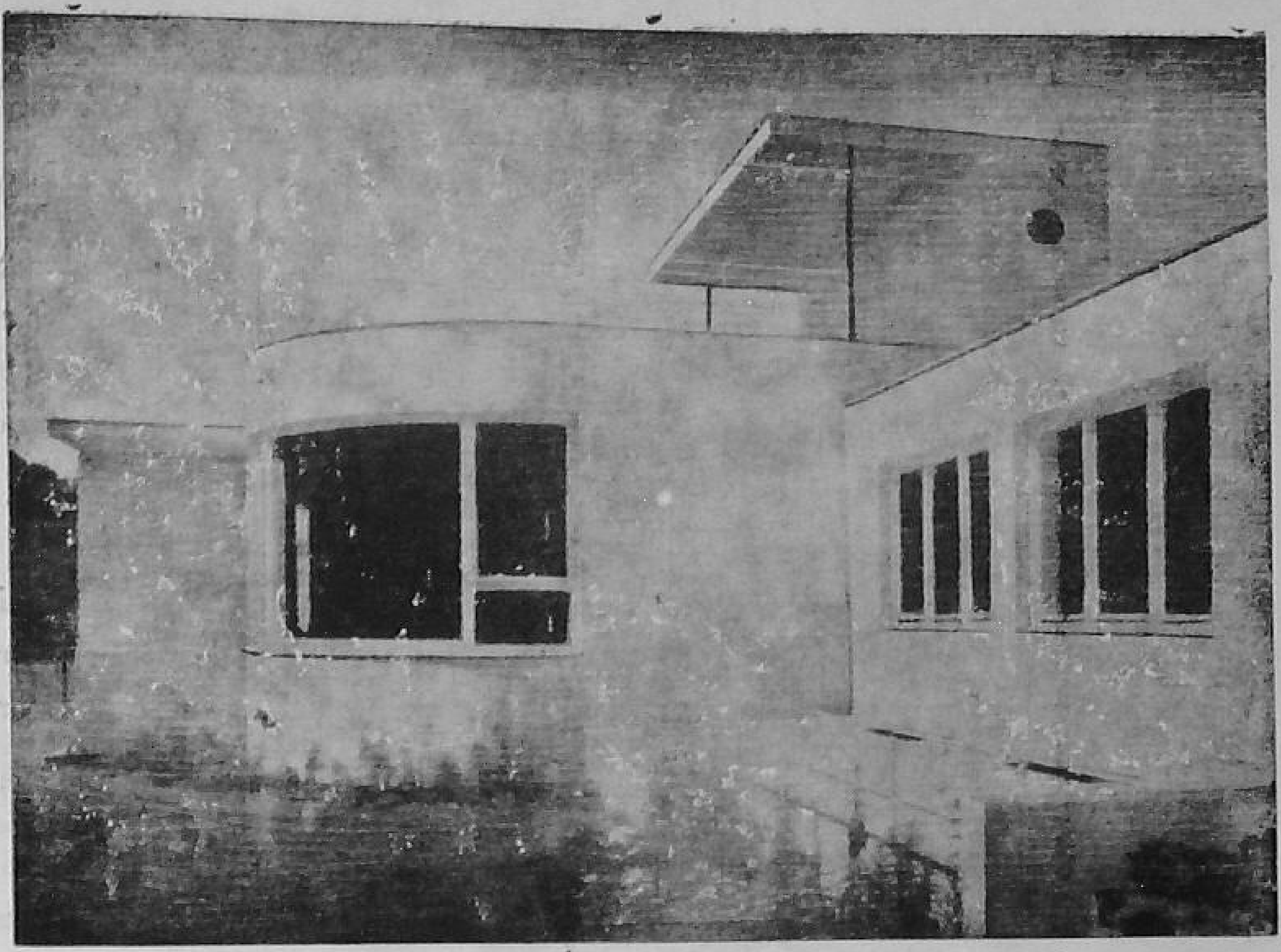


Fig. 122

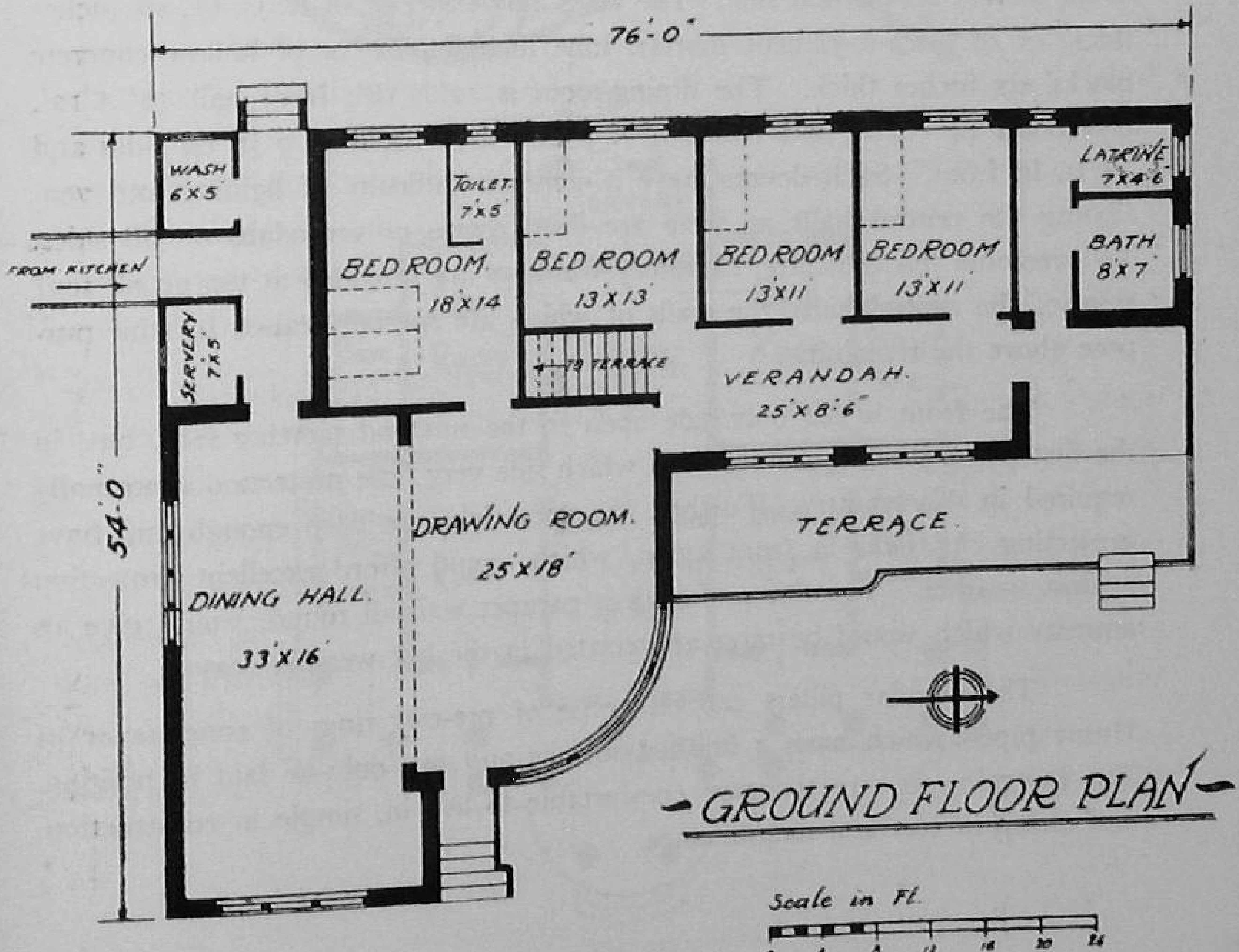


Fig. 123

PLAN NO. 48

Plinth Area: 1,972 sq. ft.

Pre-War Cost: Rs. 7,150

THIS bungalow represents a plan for which the first prize was awarded to the architect by the Cement Marketing Co. of India a few years ago in a competition for a design of a concrete bungalow in which 271 people had participated. The judges made the eventual selection on the following grounds: (1) General convenience (2) Ease and cheapness of construction, and (3) Originality.

It is designed for a place where water-carriage system for flushing privies, etc., is not available and, therefore, bath-rooms must be built outside with an entrance for the sweeper. The principles of orientation cannot be applied to such designs having bed-rooms in all directions round one or two central halls. However, such bungalows are designed and constructed to face the north. The kitchen and store-room block is a separate out-building connected to the servery by a passage. The bungalow occupies a frontage of about 52 ft. and depth 50 ft. from the end of the front verandah to that of the servery on the rear side. The walls may either be of R. C. C., six inches thick, or of brick-in-cement mortar, nine inches thick, or of hollow concrete blocks, six inches thick. The dining-room is 12′ × 18′; front hall 12′ × 12′, bed-rooms 14′ × 10′, bath-rooms 9′ × 5′ and the verandahs 7 ft. on sides and 14 ft. in front. Such designs have a common difficulty of lighting and ventilating the central halls as there are deep rooms or verandahs on all sides. To overcome this difficulty, clerestory windows are provided at top on all four sides of the central halls, the walls of which are specially raised for this purpose above the remaining.

The front is the only side open to the sun and piercing rain, but, in the first place, it is on the north on which side very little protection is normally required in this country. Further, the verandahs are deep enough and have projecting *chhajjahs* in front again, which would afford excellent protection against weather. The flat roof with a parapet wall all round, would give an amenity which would be most appreciated in the hot weather season.

The circular pillars can either be of pre-cast rings of concrete or of Hume pipes, which have a finished surface and can only be laid in position. The bungalow is sure to prove comfortable to live in, simple in construction, and cheap in cost and maintenance.

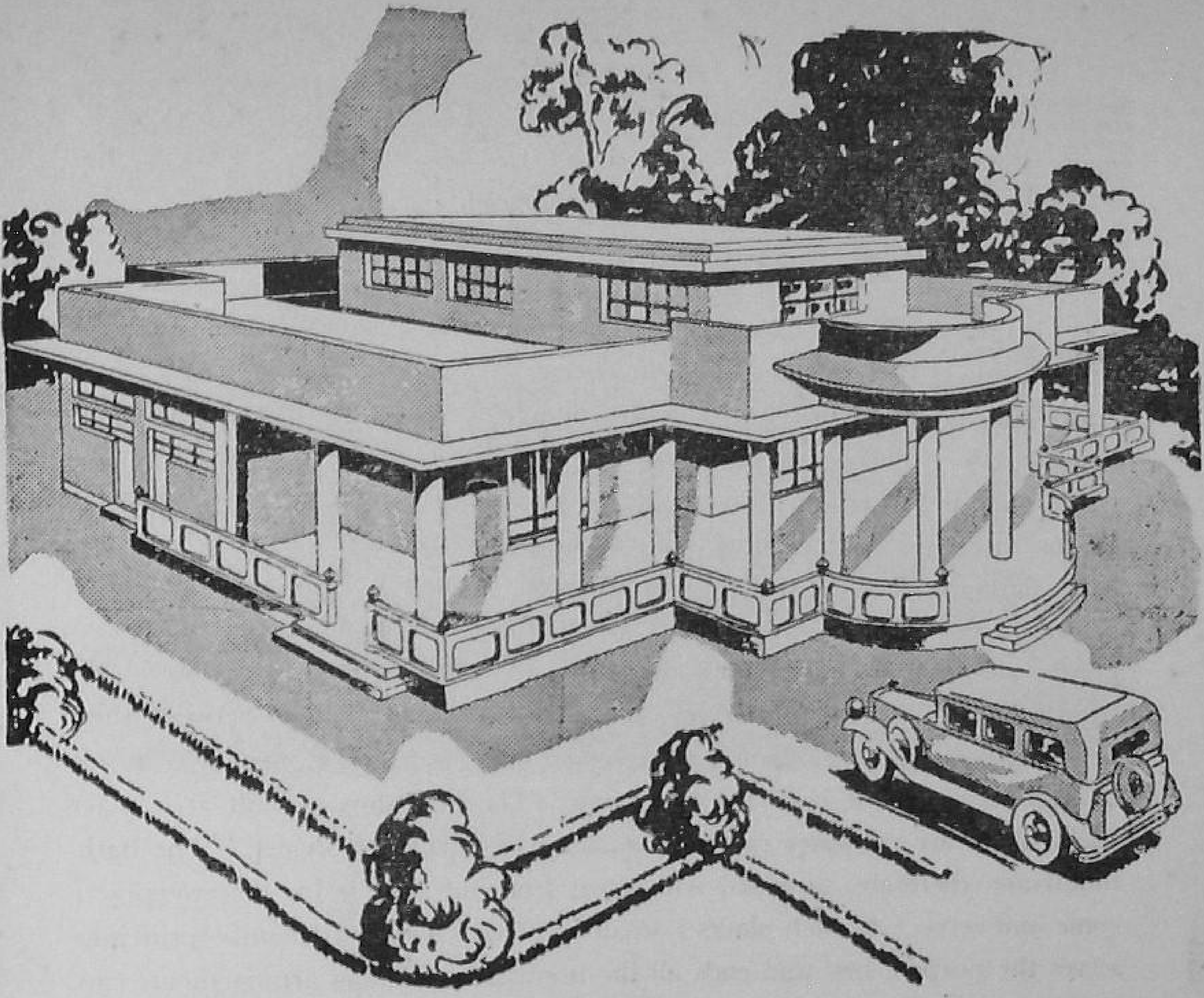


Fig. 124

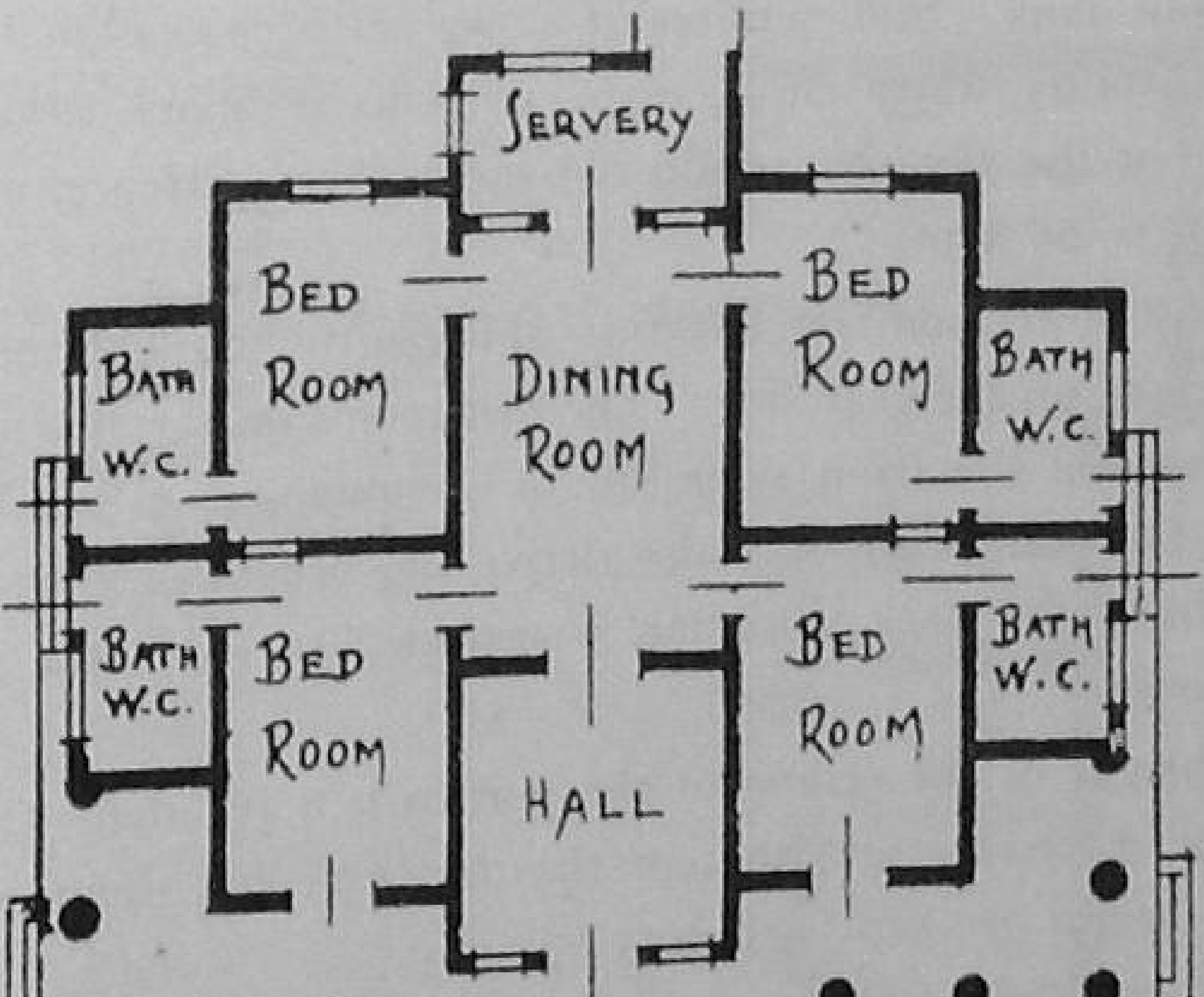


Fig. 125

By courtesy of the *Indian Concrete Journal*

Architect: Mr. Renato Dipietromia, Simla.

PLAN NO. 49

Plinth Area: 2,063 sq. ft.

Pre-War Cost: Rs. 7,350

This cottage possesses perfectly symmetrical arrangements, both inside and outside. It faces the west and covers an area enclosed by about 55 ft. width and 41 ft. depth. It is more suitable for a family living in the European style. There is a portico of elliptical shape 10 ft. deep in front. As the cottage is facing west, this would be very enjoyable the whole day, except in the afternoon and evening, till the sun sinks below the horizon. Behind it is a large room, 18 ft. wide and 27 ft. deep, divided by a cloth curtain into a drawing-room and a dining-room. Beyond this is a small verandah to serve mostly as a passage. On both the sides are arranged two bed-rooms in the front and two in the rear, the sizes of which are very good, and between these bed-rooms are placed a bath and w. c. on either side to be used in common by the occupants of both the bed-rooms. The bungalow is built at a place where there are no water carriage and drainage facilities provided. The bath-rooms are, therefore, provided with doors from the outside for the sweeper to come and serve. At such places a small septic tank built on scientific principles serves the purpose best and ends all the troubles, as flushing arrangements can, in that case, be easily made; the purification of sewage takes place automatically inside the septic tank. Still, services of a sweeper are occasionally required for keeping the sanitary wares clean, since, in India ordinary servants, belonging to any class but the sweeper, would not touch them. Hence, an entrance for a sweeper has to be kept.

A small store-room on one side and pantry on the other are symmetrically placed on the rear side. The bed-rooms on the rear side are spread out a little beyond the front sides just to accommodate a window facing the west. Thus the rear bed-rooms also derive the benefit of the western breeze. A staircase from the back verandah is provided to reach the terrace on the top of the house.

The height of the ceiling of the portico is 8 ft.; that of the bed-rooms on either side is 10 ft.; and that of the drawing- and dining-room is 14 ft. In this extra height are kept clerestory windows.

The cost per square foot of the plinth area is rather high because the materials used, the workmanship and the general finishing are of a superior order.

The outer walls are of brick-in-lime plastered on both sides 14 inches thick; the side walls of the drawing- and dining-rooms are of brick-in-cement mortar, 9 inches thick, and all the remaining ones 4½ inches thick in cement mortar.

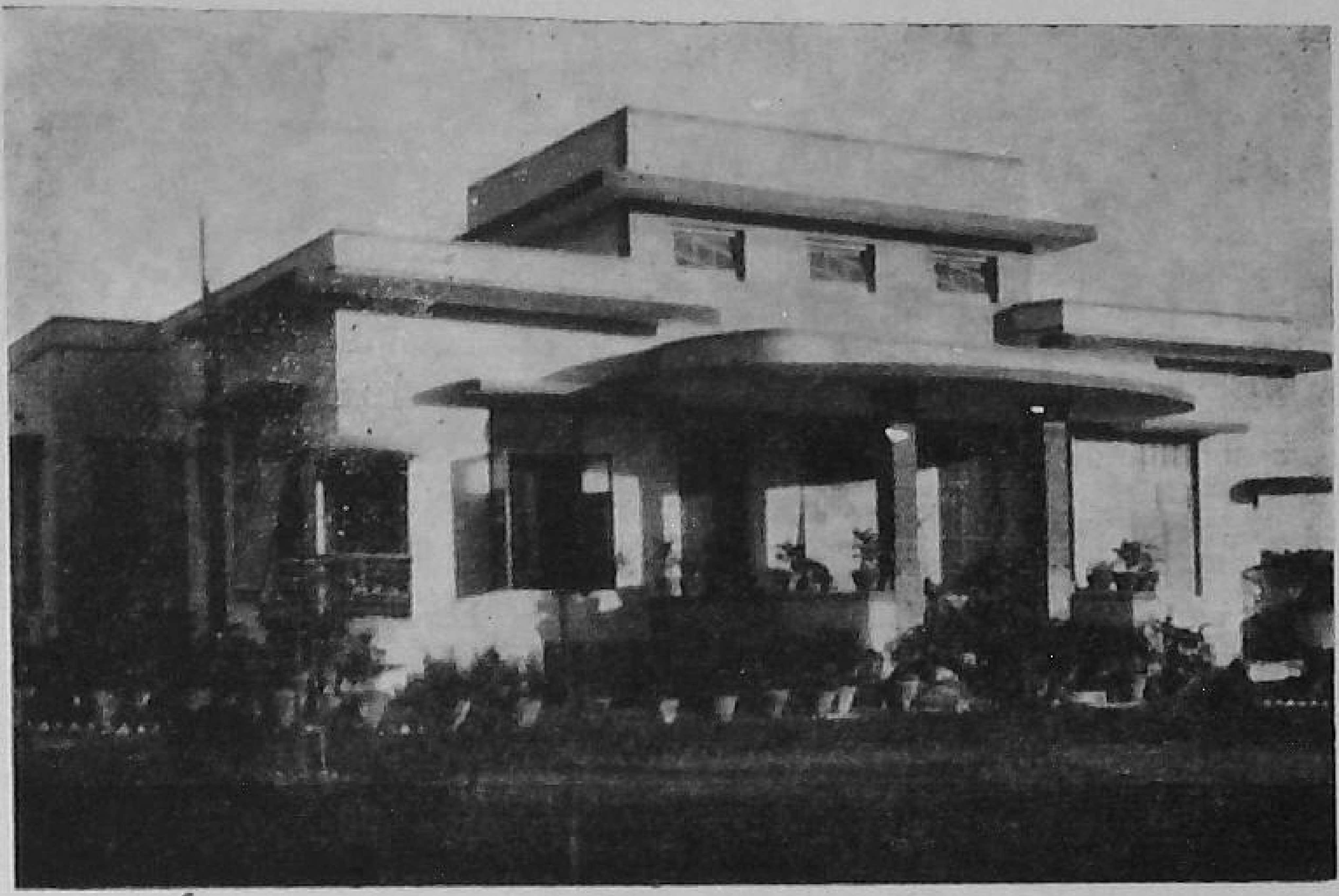


Fig. 126
Architects: K. R. Bhansali & Co., Bombay.

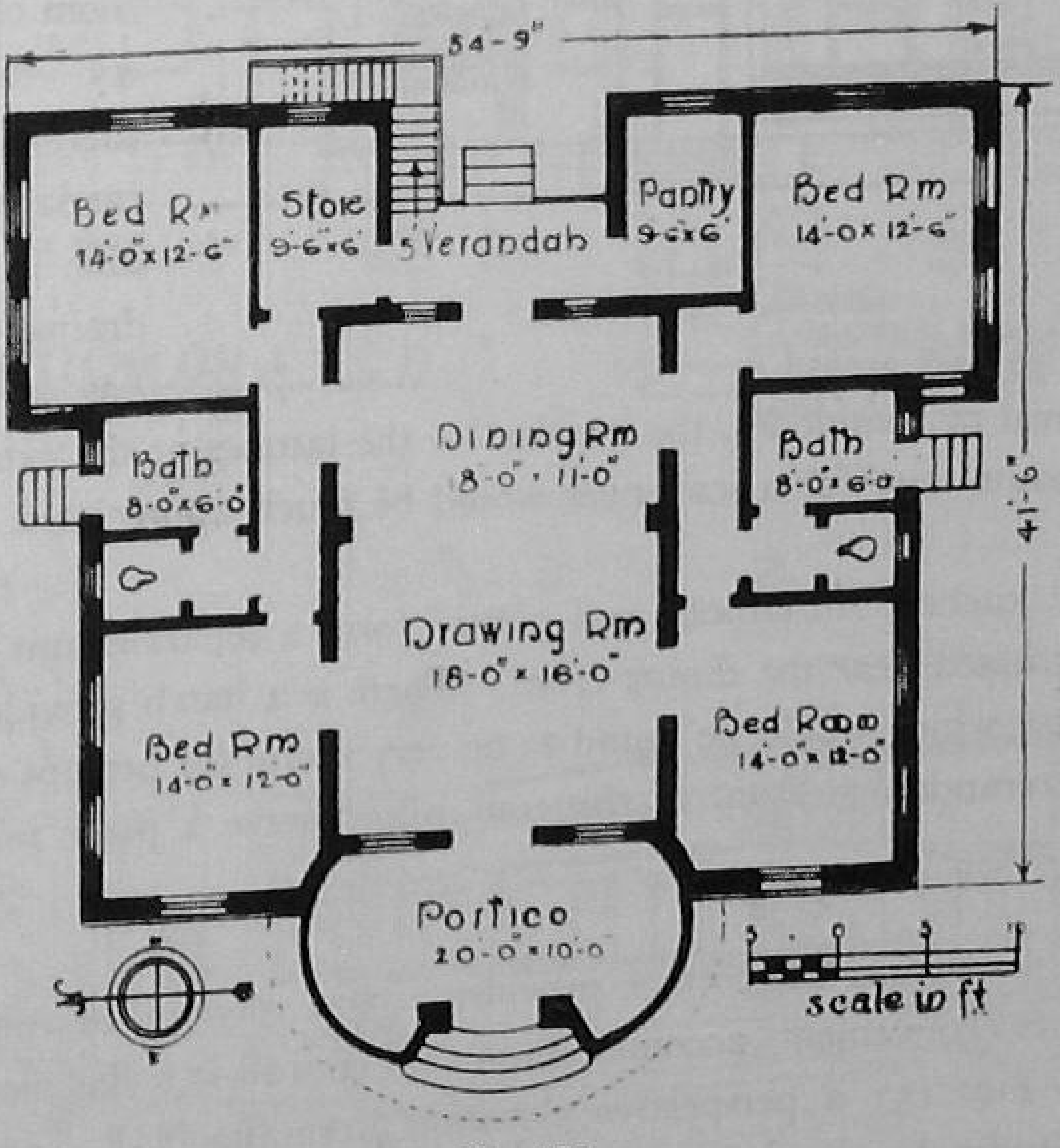


Fig. 127

PLAN NO. 50

Plinth Area: 2,583 sq. ft.

Pre-War Cost: Rs. 11,850

THE plans shown in Figs. 128-131 are of a beautiful and very convenient cottage facing N.-E. There is a 10 ft. verandah in the front, which being on the north and east would provide a cool place to lounge in summer. At one end of it there is a spacious room for an office, very conveniently situated. The drawing- and dining-rooms, which are both commodious, are separated only by a cloth curtain, so that on special occasions they can be combined into a large congregation hall. There is a passage provided between the bed-rooms and the drawing- and dining-rooms, so that servants can go from the front to the rear without disturbing the privacy of any of the rooms, particularly the bed-rooms.

The bed-rooms are of commodious size, viz., 14′ × 12′. One of them is provided with a dressing-room and a bath-room and the other with a bath-room only. In country districts where there is no water-carriage system available for flushing drains, and resort has to be made to hand removal of commodes, the position of the latrines at the extreme rear end with a separate door for a scavenger would be much appreciated.

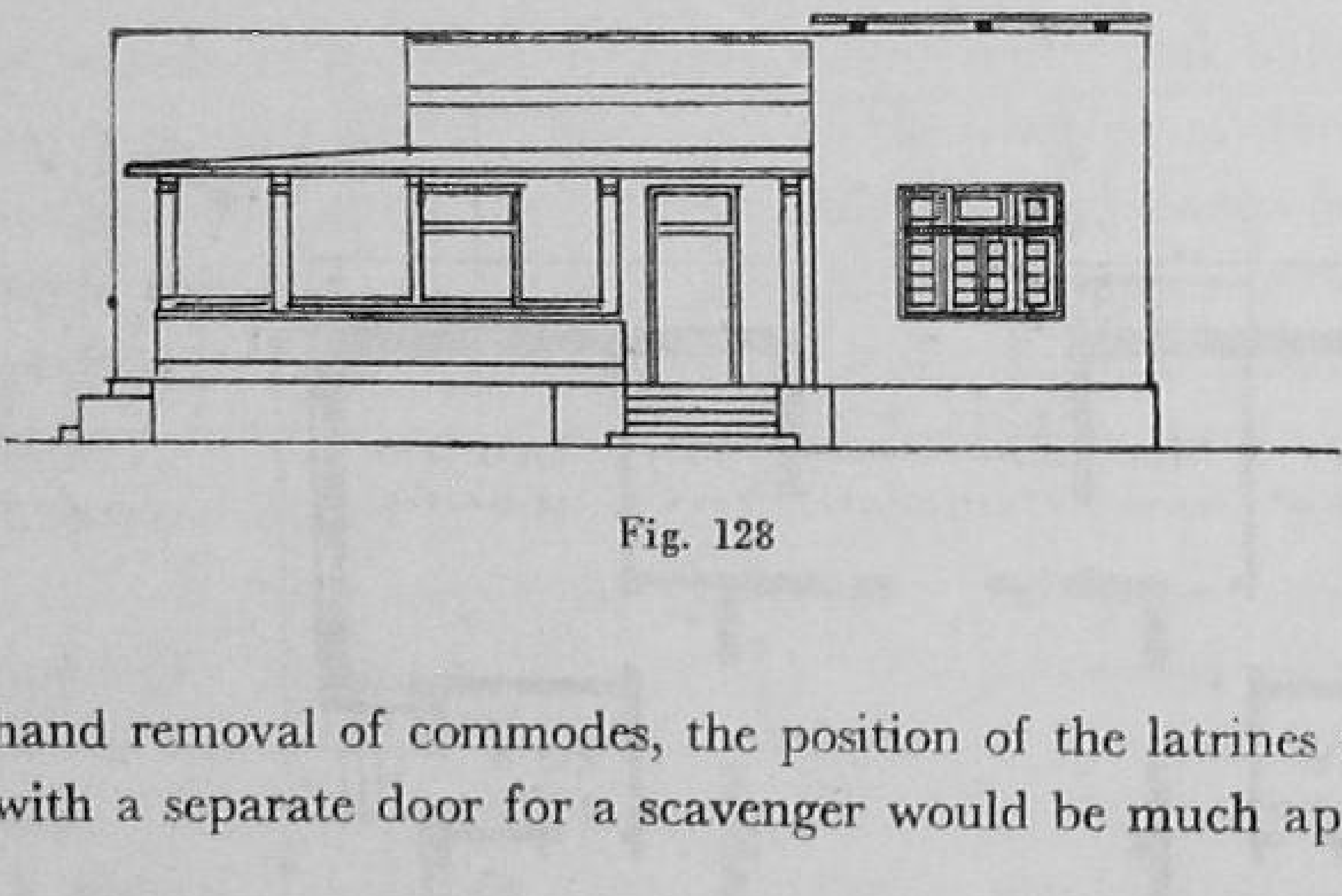


Fig. 128

The kitchen, store-room and pantry form a separate unit which is conveniently situated near the dining-room. There is a hatch provided in the wall of the pantry which would be found to be very useful for prompt dinner service. The 7 ft. verandah in front of this unit would serve a place for the servants in waiting.

On the whole, the cottage provides a most economical and, at the same time, a very convenient accommodation. Fig. 128 is a flat elevation on the north side, Fig. 131 a perspective elevation from the N.-E. corner, and Fig. 130 a longitudinal section along the line ABCD, showing the positions of doors, windows, and their heights and also height of ceiling and depth of foundation.

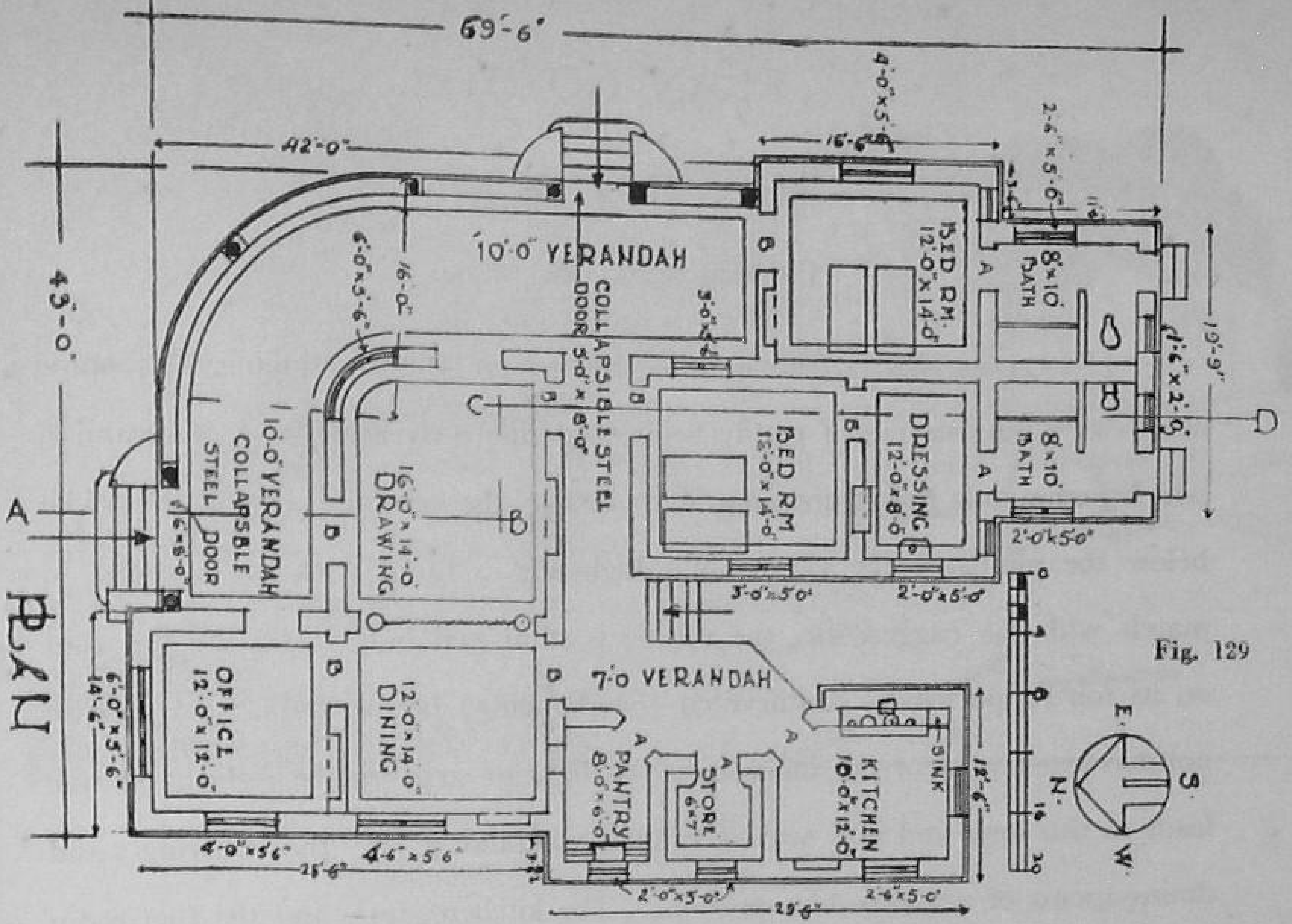


Fig. 129

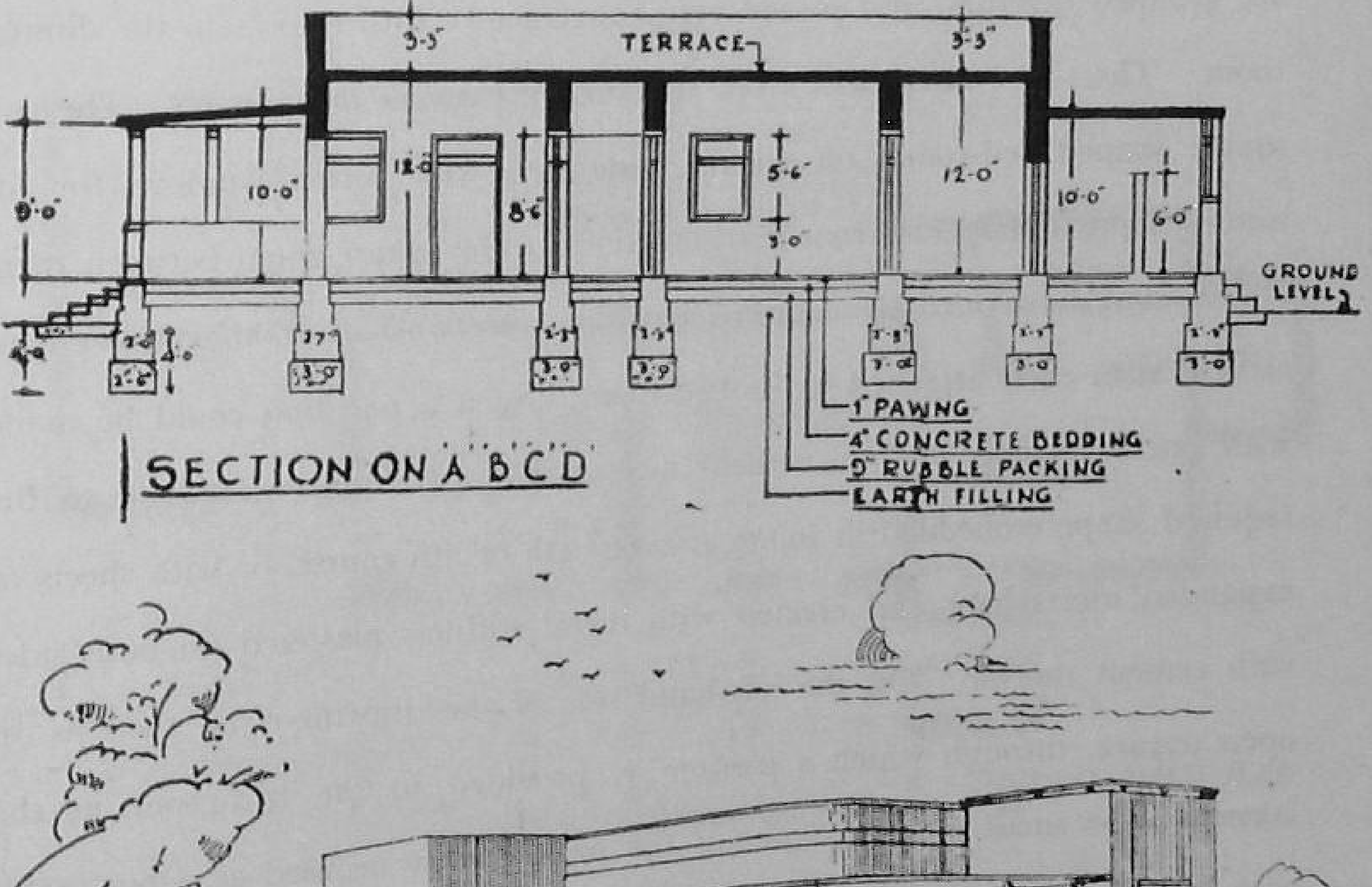


Fig. 130

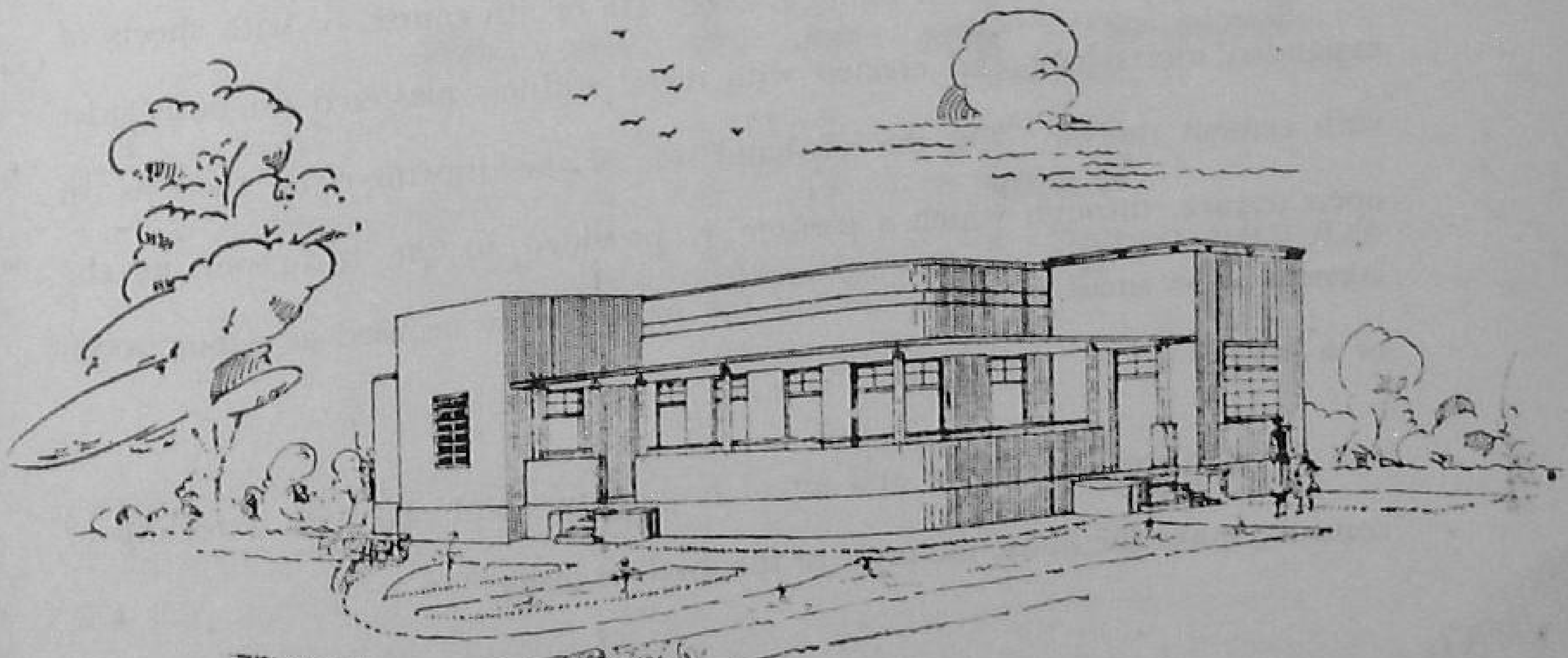


Fig. 131

PLAN NO. 51

Plinth Area: 1,880 sq. ft.

Pre-War Cost: Rs. 8,750

Nestling low to the ground, rugged and steeply sloping, this home overlooks a long stretch of paddy fields bordering a river. The open verandah which commands the entire view is treated as the central feature. The wall below the plinth of the verandah is high and is faced with rustic stones to match with the rugged site, the railing is stout and bulky, and the flat roof on its top supported by cantilevered (overhanging) beams, projects to give an uninterrupted view of the landscape. A flight of steps on the right-hand side leads to this long and very wide verandah. Behind it are the drawing- and dining-rooms of very good proportions. The kitchen, store, and the fuel room are grouped together, and placed very conveniently with respect to the dining-room. There is a back door from the kitchen through the passage. The two square shaped bed-rooms on the rear side have wide corner windows for admitting light and breeze from two directions. The square room between them is very cleverly divided by a curved partition into two bath-rooms of very convenient sizes each attached to its bed-room. Such a partition could be made with bricks on edge laid in cement mortar with two stout wires bent to the required shape embedded in joints at every 4th or 5th course, or with sheets of expanded metal bent and erected with metal stiffners plastered on both sides with cement mortar. On the left-hand side of the drawing-room there is an open terrace, through which a passage is provided to the bed-room in the corner. The small room in front of the passage may be used as a box room or a study.

Its rugged simplicity and air of hospitality, combined with a feeling of comfort, make the house the pride of the dwellers inside.

Fig. 132

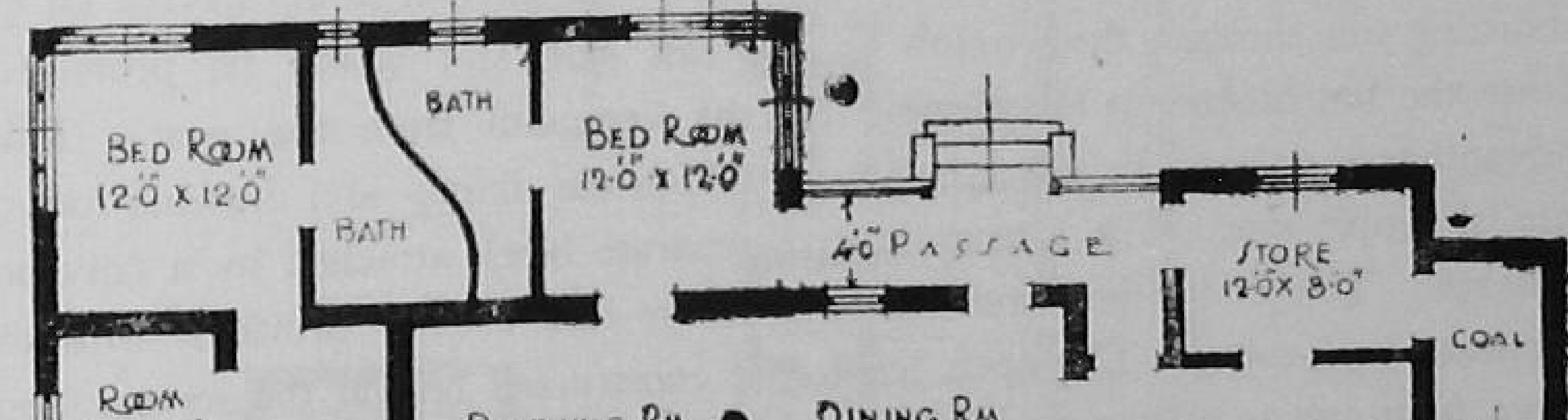


Fig. 133

PLAN NO. 52

Floor Area: 4,097 sq. ft.

Pre-War Cost: Rs. 16,600

THE home pictured here has received very careful thought on the part of the designer to provide the maximum comfort and happiness to the dwellers inside. It is not designed for considerations of economy as will be seen from the large space allowed to be occupied in verandahs. The plan would be more suitable for a corner plot if oriented in the manner shown, and is calculated to contribute to the maximum comfort.

The main entrance is in a corner under a lovely canopy which is overhanging so much outside the face of the verandah, as to afford a full shelter for an automobile. All the rooms are so arranged that every one of them is protected by a verandah at least on two sides. The house provides the best circulation possible. The special feature of the plan is that the house can grow according to the needs of the family. It would suffice, for instance, in the beginning to build up to the ladies apartment and afterwards to build bed-rooms behind it, one after another as needed. The kitchen would have a lot of morning sun through the window on the east side and would be protected from the hot breezes in the evening by the verandah from the west. This advantage is enjoyed by every bed-room. Both the dining- and drawing-rooms are of ample size. The kitchen is in a separate block attached by a covered passage. The bed-rooms are sufficiently large and each is provided with its separate bath-room. The open terrace, if constructed behind the servery and store room, so as to join the verandah in front of the kitchen with that on the back of the ladies' apartment and office room, would serve as an excellent place for outdoor dining- or sitting-room. This terrace, moreover, would be an ideal place for young children to play under the supervision of ladies both from the kitchen and the ladies' apartment. A railing would be required in that case, on the south side of the terrace, lest children fall down.

The elevation is very attractive. The main walls are of brick 14 in. thick, rendered in snowcrete on the outside. The partitions are half-brick thick. The height of the ceiling is 12 ft. above the floor level.

A house on such an extended open plan would be ideal at the sea coast. The next best location is a hilly district like the Deccan. It is not suitable for either plains of Northern India or hill stations where a close and compact plan is required.

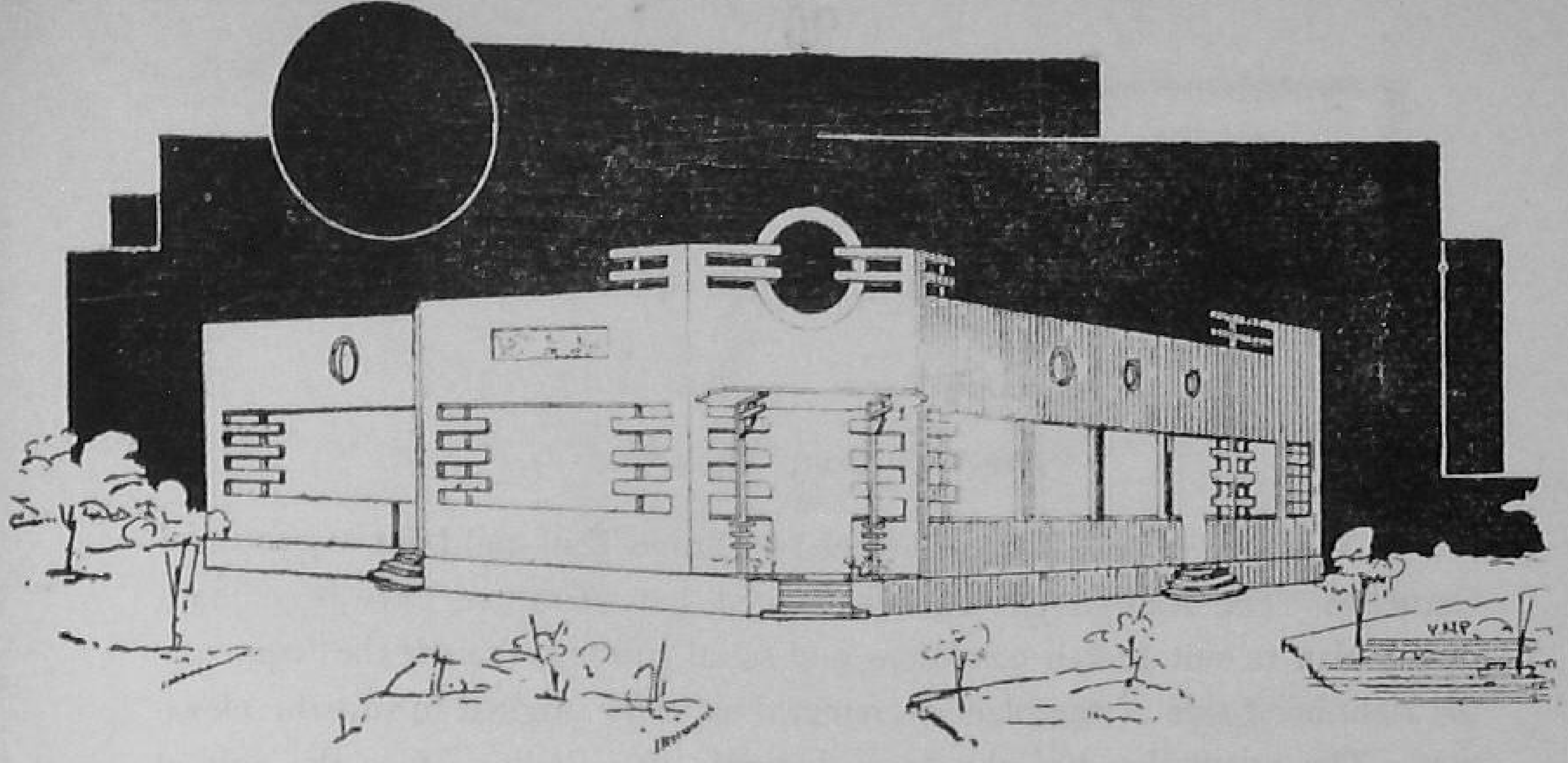


Fig. 134

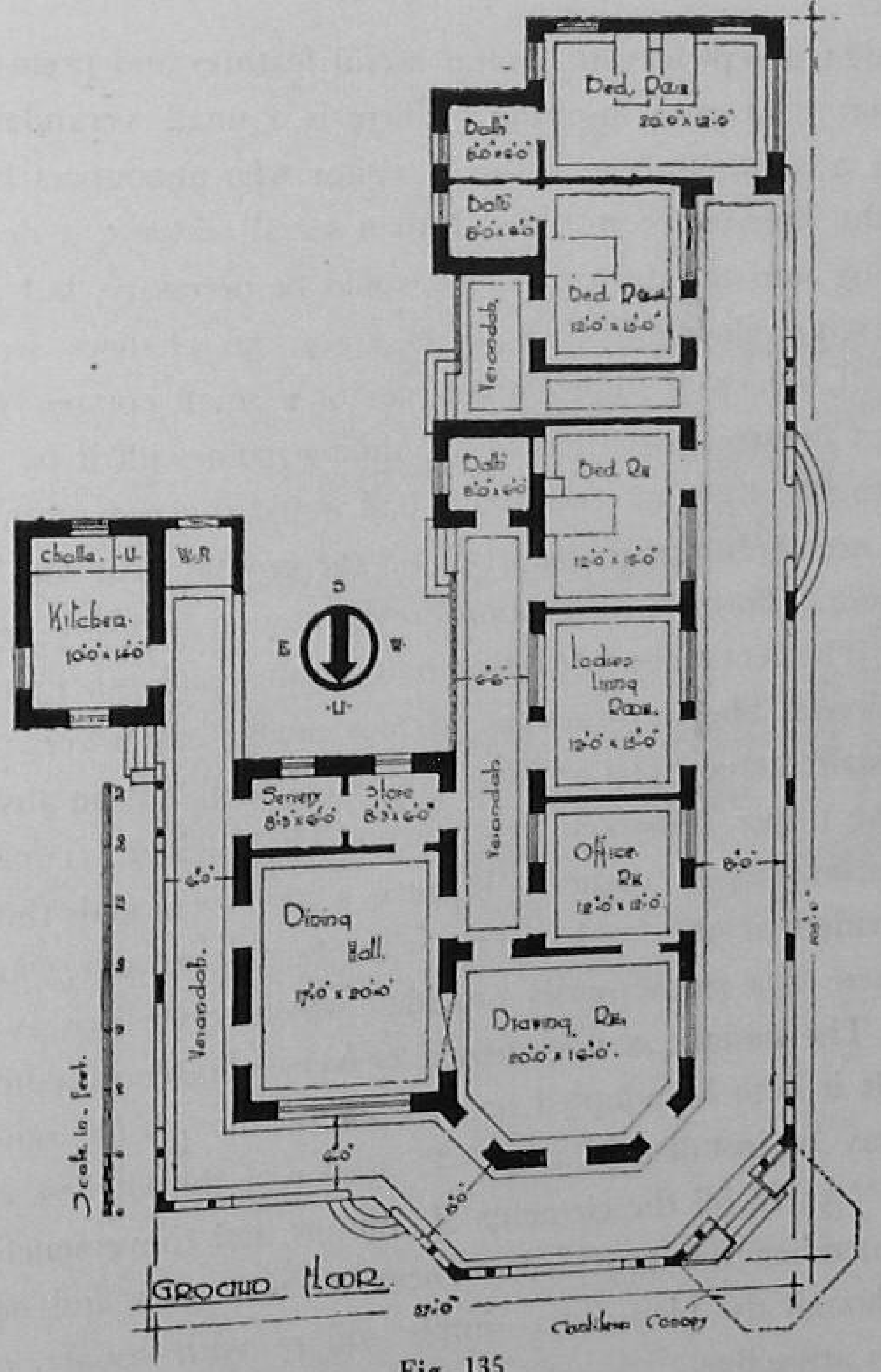


Fig. 135

20

STOREYED COTTAGES

PLAN NO. 53

Plinth Area: 1,383 sq. ft.

Pre-War Cost: Rs. 4,600

THIS is a famous cottage designed by Bruno Taut and built at Stuttgart, Germany. The isometric elevation is original, but alterations have been made in the plan to suit Indian conditions and social customs, though the front and the right-hand side of the plan are retained as in the original to suit the elevation. The orientation has also been changed. It is built to face the east at Stuttgart, but for Indian conditions, it would be suitable for the south or south-east.

The design is replete with several useful features and possesses a charm in simplicity that is at once inspiring. There is a small verandah in front, just to serve as a waiting-place, before a visitor who announces his arrival is admitted into the drawing-room. For Indian social customs, a door from the verandah opening into the drawing-room would be necessary, but as I wanted to retain the original elevation to show its grace, no changes were allowed. The drawing-hall, which is sufficiently large for a small cottage like this, is further increased in size by combining the dining-room with it by a cloth curtain. Thus both the drawing- and dining-hall would function to the maximum extent. There are three bed-rooms—two on the ground floor and a large one on the upper floor. Both the bed-rooms on the ground floor are provided with clothes closets. The rectangles with diagonals crossing each other shown in bed-rooms are the closets. The bath-room is spacious enough and is very conveniently situated. The staircase occupies an ideal position accessible from any room leading either to the upper bed-room or terrace. The kitchen occupies the most suitable position, viz., N.-E. corner. There is a small verandah through which an exit is provided at the back. The w. c. is just outside, but adjoining the house. There is a smoke-outlet provided which serves also as a fire-place and chimney. The design, as it is, would be very suitable in a hill station in this country. If it is to be adopted on the plains, the *chulla* range with its smoke-outlet may be installed in the N.-E. corner of the kitchen. Thus, in a space of 31 ft. × 33 ft. all the elements of comfort and convenience for a family of 6 or 7 members are provided. There are no curves and no projecting balconies. Although the plan is a simple square with square corners, the elevation is most attractive.

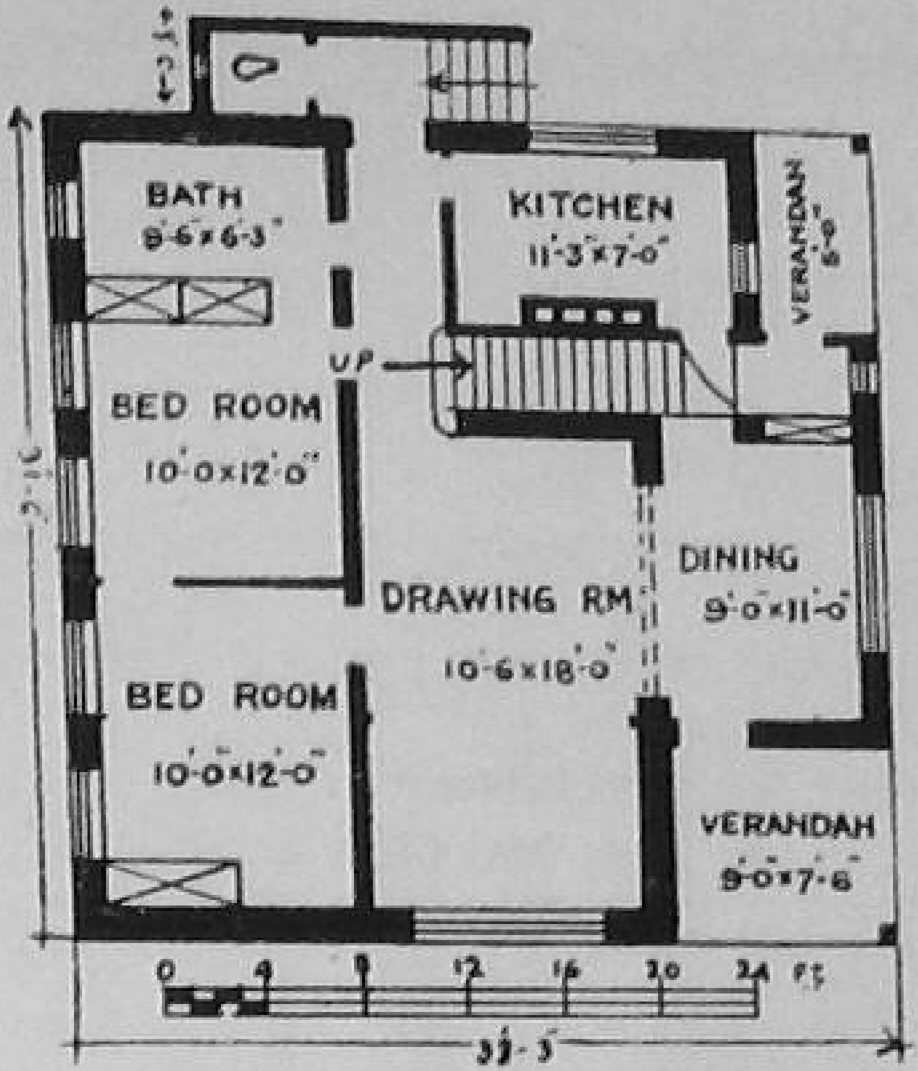


Fig. 136

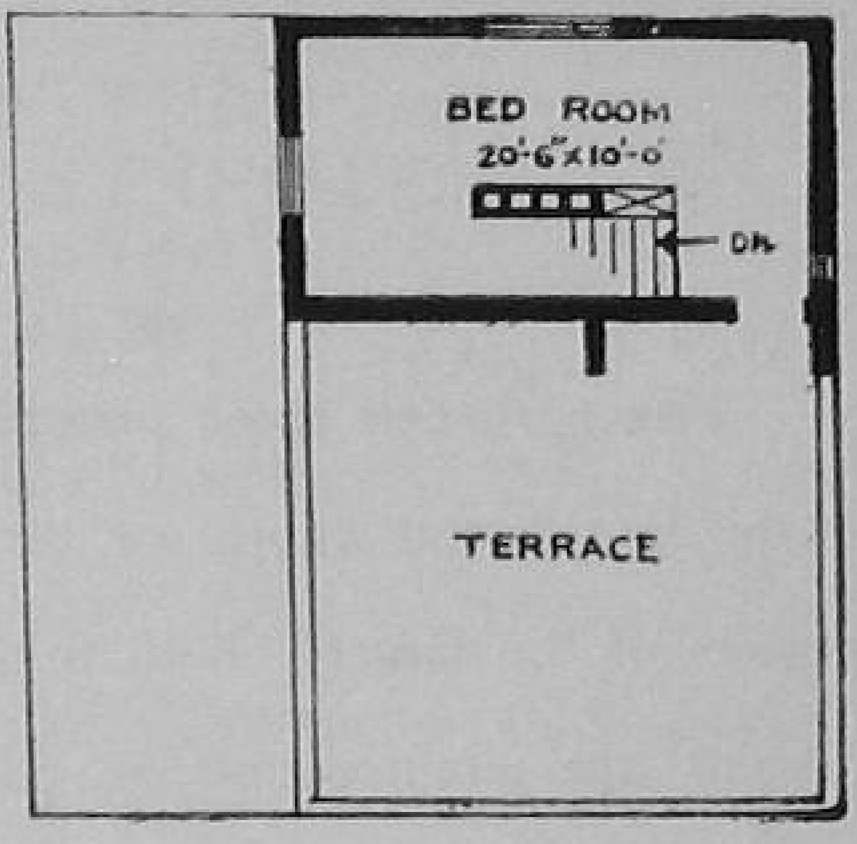


Fig. 137

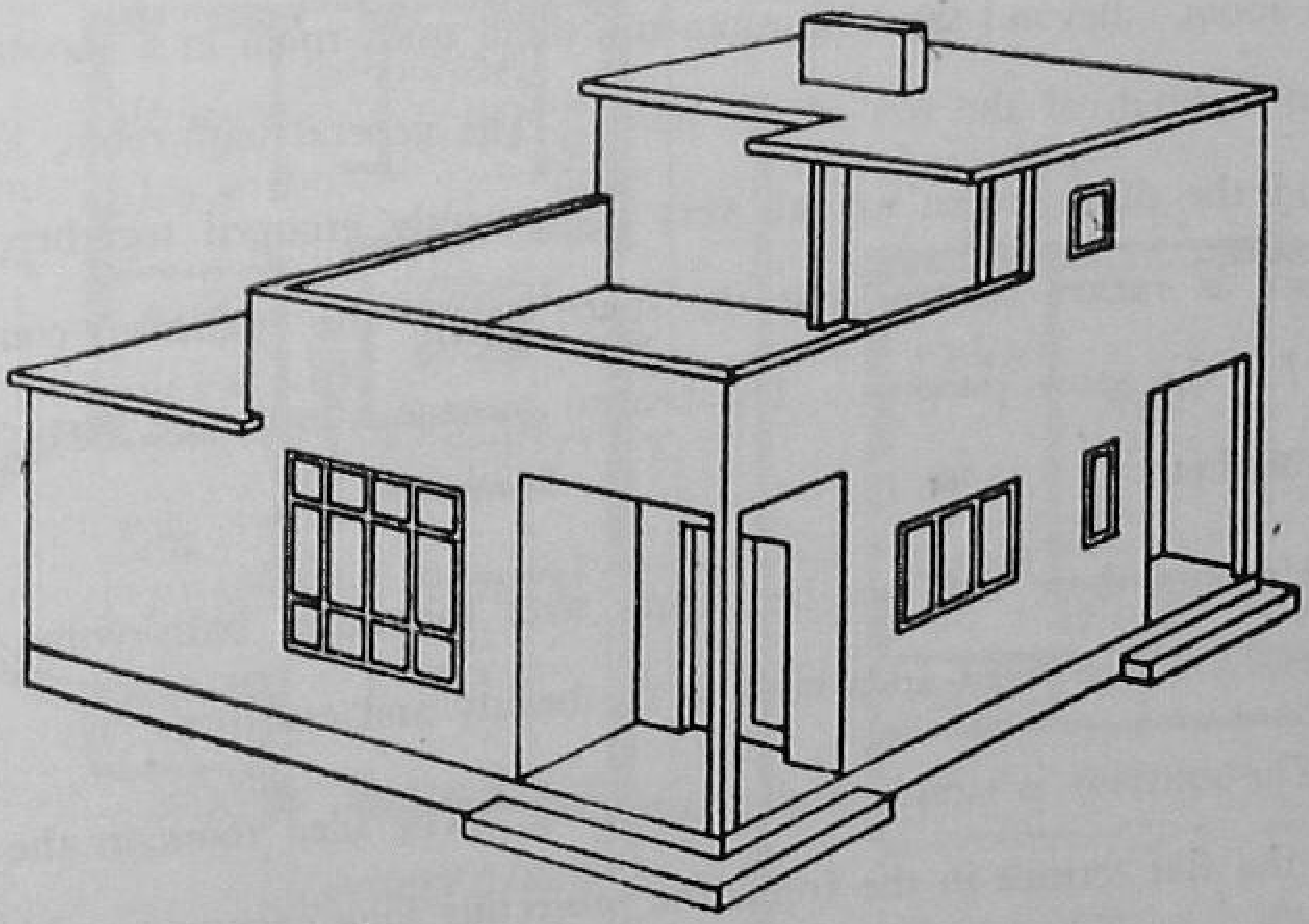


Fig. 138

Architect: Bruno Taut, Germany.

PLAN NO. 54

Floor Area: 1,635 sq. ft.

Pre-War Cost: Rs. 7,550

THE gardened home pictured on the opposite page combines economy and the sentimental appeal of the small house with the comforts and conveniences of the larger. Both in appearance and in interior accommodation it avoids the crampedness which is usually experienced in the average small home.

At the entrance there is a conservatory of evergreen fresh plants of variegated colours, which is most inviting. The four feet passage runs straight and on its right-hand side just at the entrance is the good-sized drawing-room. The bed-room on the left-hand side, with five windows in its wide sweeping segmental front side, and a spacious concrete flower box in front is most pleasing, and with the large bath-room attached to it would serve as a veritable comfort room. Beyond the bath-room is a small study-room in a corner away from the hubbub of the rest of the house. The general bath-room, kitchen, store and the dining-room are all very conveniently grouped together. The store-room is rather narrow, but the space below the staircase could be utilised for the same purpose. The central passage affords the best circulation throughout.

Upstairs there are two bed-rooms with their own bath-rooms. The large terrace in the front adds both to the beauty and comfort.

The exterior is simple and unassuming. The tiled room in the background, the flat terrace in the front, the projecting long canopy over the windows, and the conservatory of fresh plants on both the floors, all combine to give it a charm and distinction which are sure to appeal to everybody.

The plan is suitable for even a narrow plot, say, with a frontage of only 40 ft.

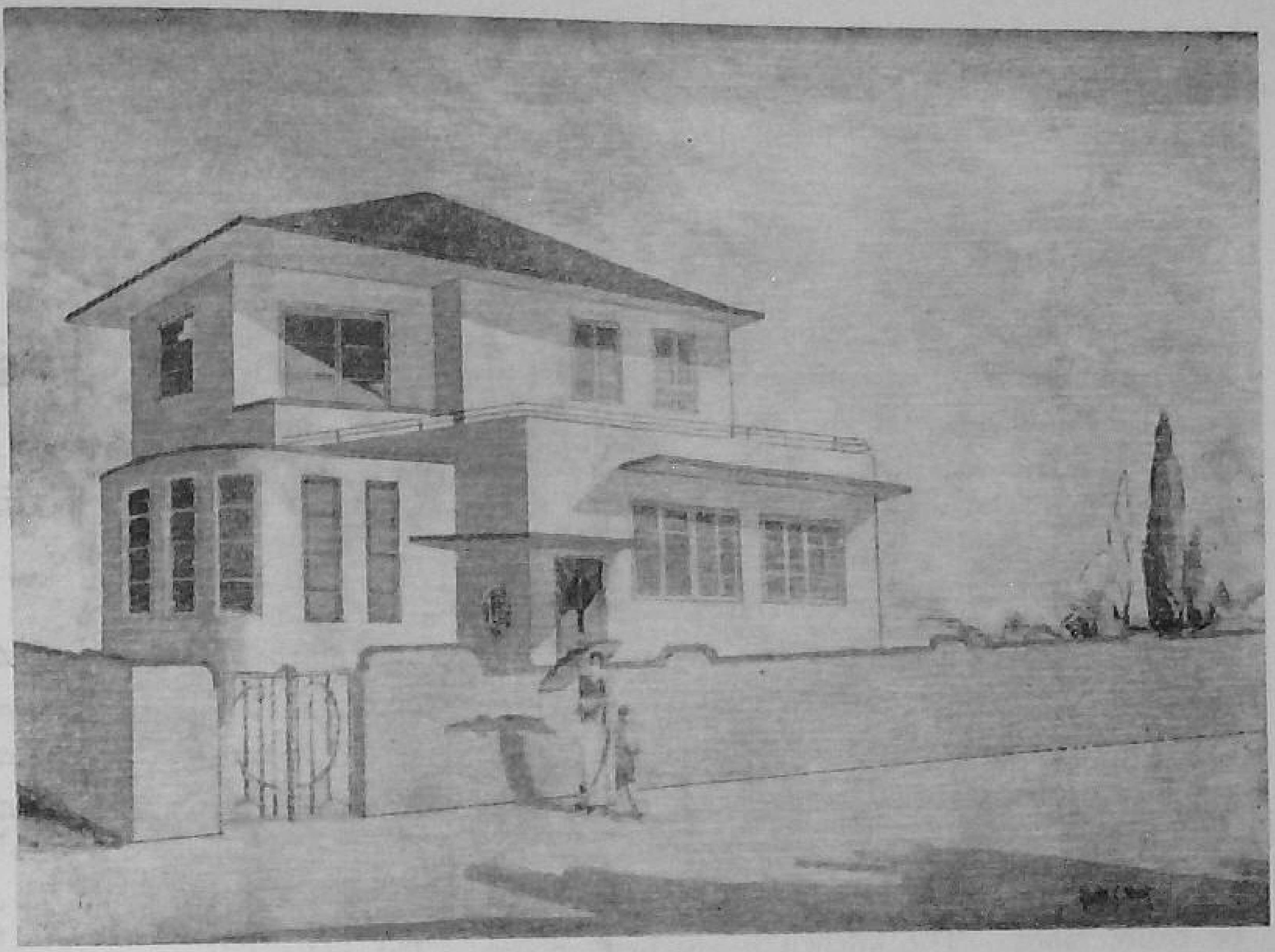


Fig. 139

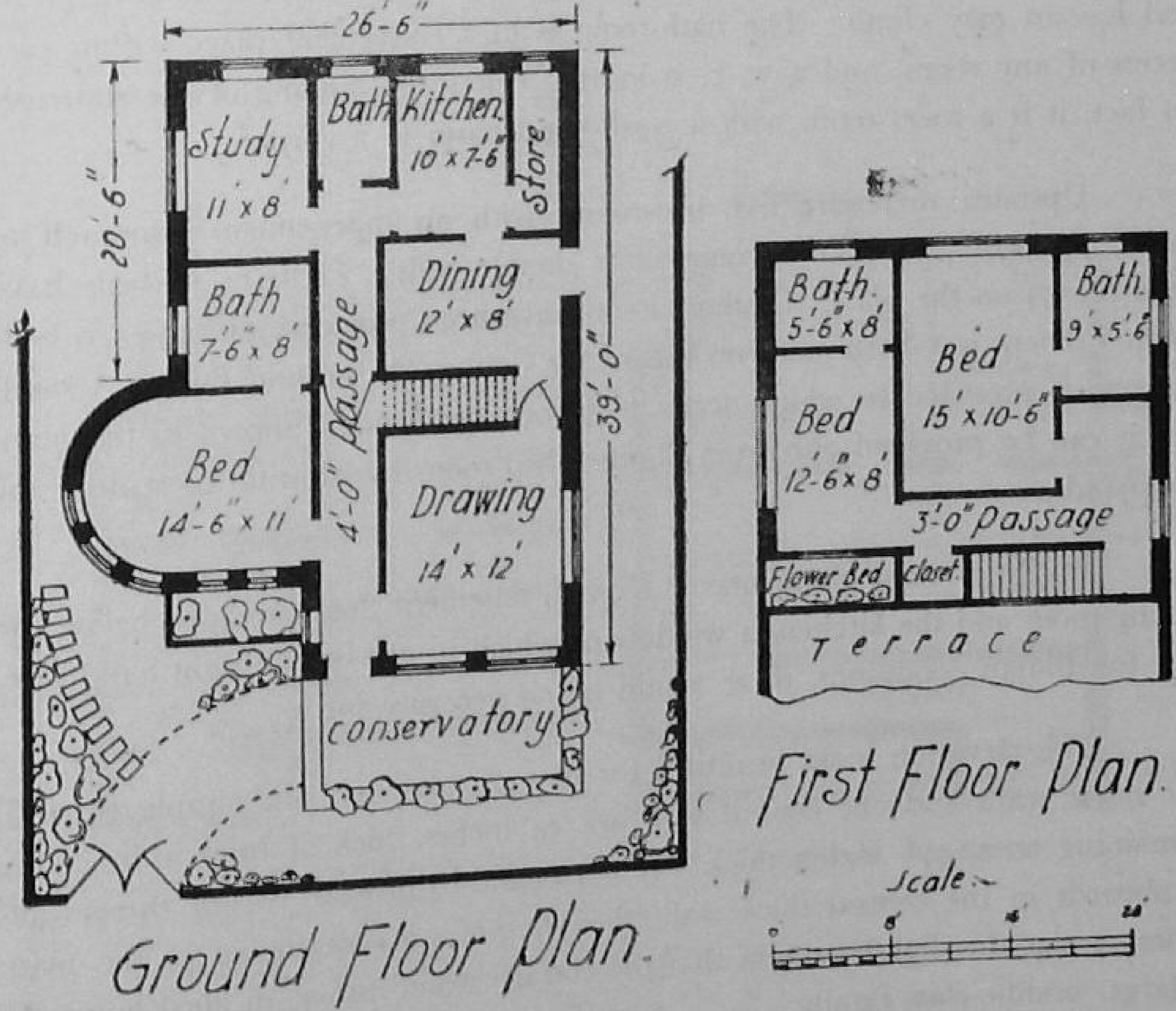


Fig. 140

PLAN NO. 55

Floor Area: 1,674 sq. ft.

Pre-War Cost: Rs. 5,750

THIS is another cottage well known in Europe. It was designed by Victor Bourgeois of Belgium and is built in Brussels. Considerable alterations have been made in the plan to suit Indian conditions, though to suit the photograph, the front and the right-hand side of the plan have been kept as in the original.

It occupies, roughly, an area of 32 ft. by 32 ft. only, and still affords as much accommodation as five bed-rooms, kitchen, dining-room, verandah and two bath-rooms, which is indeed a marvellous thing. There is an open terrace in the front which leads to the large drawing-room. A folding partition or a cloth curtain is arranged between the drawing-room and dining-room, where double dotted lines are shown, so that on special occasions either one large drawing-room or one dining-room 30 ft. long and 12 ft. wide can be easily made. The kitchen is spacious enough. The verandah near the kitchen would prove a very good utility room. The staircase is 3′ 6″ wide and has an easy climb. The bath-room is in a convenient place within easy access of any room, and a w. c. is located below the landing of the staircase. In fact, it is a toilet-room with a wash-hand basin in a corner.

Upstairs, there are five bed-rooms with an independent approach to each. Two of them can accommodate double beds. Positions of beds have been shown on the plan. Clothes closets have been provided, one in each bed-room. There is a bath-room on top of the one on the ground floor. A small balcony is provided to which access from one bed-room is shown in the plan, but it can be provided also from another bed-room by substituting a door for the window.

In the original plan, there is a small basement floor provided below the dining-room and the kitchen, a window of which is seen on the right-hand side. But for Indian conditions, there would be no necessity for it.

The elevation looks beautiful for its very plainness and simplicity. All the outer walls and one central wall are 14 inches thick of brick-in-lime, the remaining ones, 4½ inches thick. It is possible to provide two or three wall-cupboards in the central thick wall, though they are not shown in the plan. There is not the slightest doubt that the cottage would prove an ideal home for a large, middle-class family.

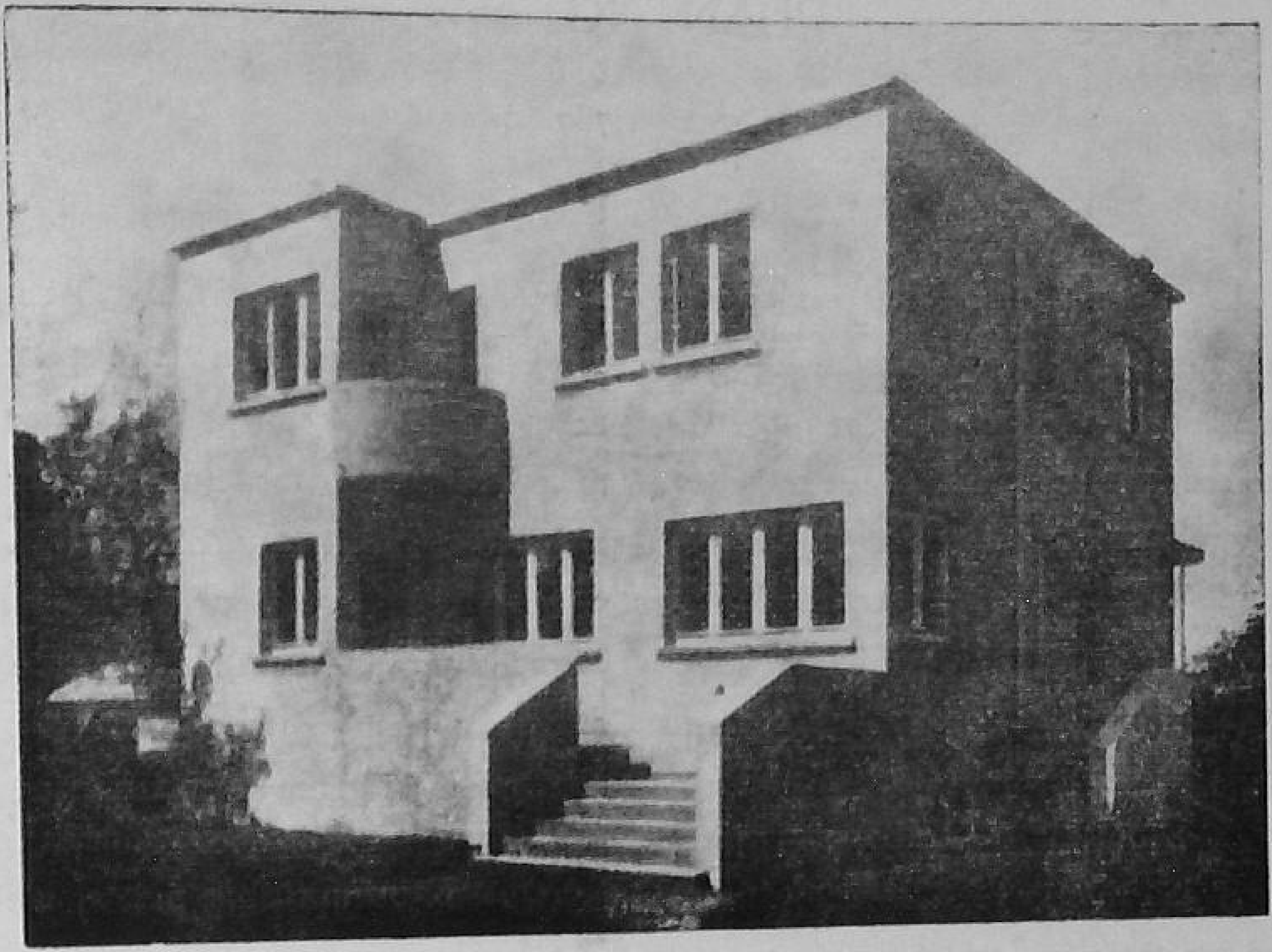
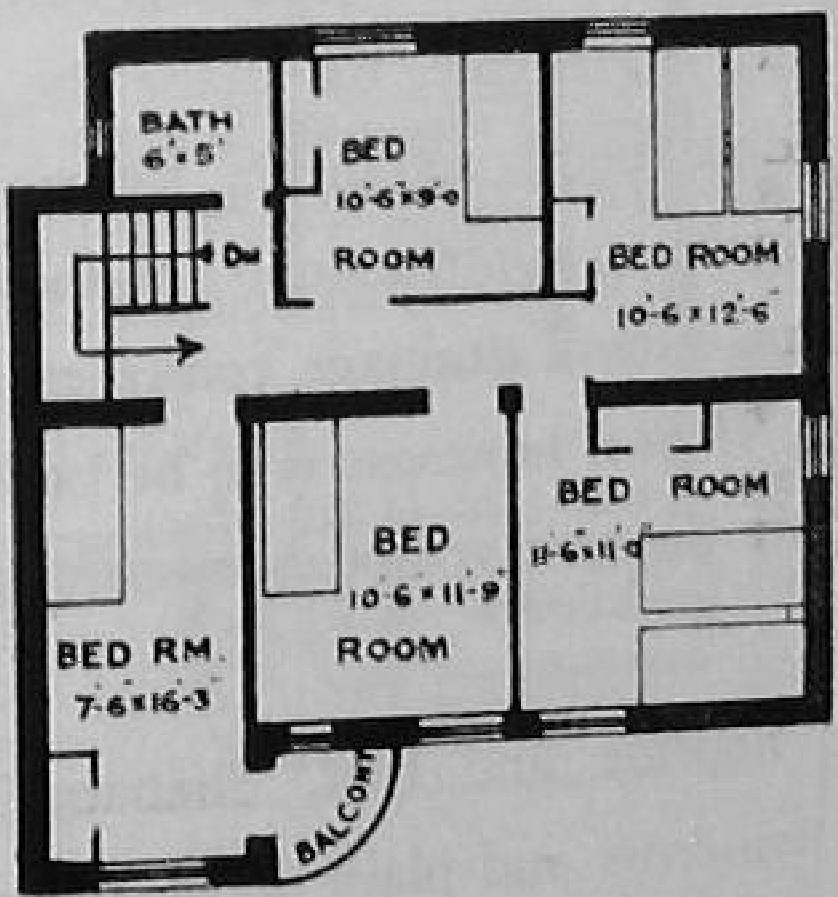


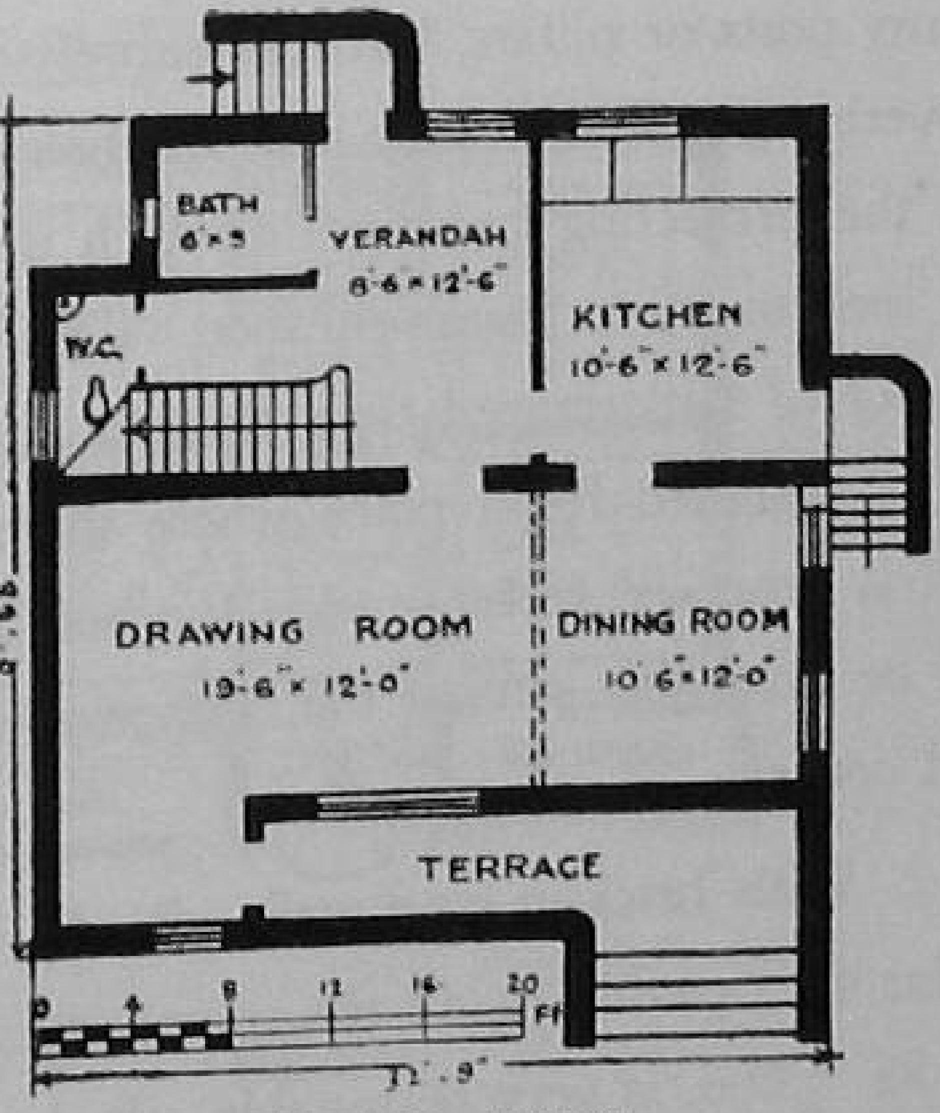
Fig. 141

A Cottage in Brussels. *Architect:* Victor Bourgeois, Belgium.



FIRST FLOOR

Fig. 142



GROUND FLOOR

Fig. 143

PLAN NO. 56

Floor Area: 1,760 sq. ft.

Pre-War Cost: Rs. 5,800

The design of this cozy cottage is sure to appeal to everybody. It is an example of what can be achieved by skilful planning even in a small space and with a small amount of money at one's disposal. It encloses a space less than 900 sq. ft., and yet provides all the amenities of a modern home for a family of six or seven members. It meets all the normal requirements of a middle-class family. A verandah in front and rear, a large drawing-hall, a nice kitchen, a spacious dining-room, and a small store and bath-room on the ground floor, and four nice bed-rooms with a common bath-room on the upper floor, all grouped together in a most compact and convenient manner, certainly must prove a delight to the occupants. The bed-rooms are no doubt small, but what a large, middle-class family needs is the number of the rooms, and not their size, which must necessarily be restricted according to the budget.

Since the bath-room and the kitchen abut against a common wall, it is possible to carry the flue gases by constructing one common chimney, for in the countryside firewood is usually burnt and this causes smoke.

Note that the balcony on the top of the front verandah is not supported by any posts or pillars, but it is entirely anchored inside the wall and made to overhang. The canopy over the balcony does likewise. The central feature, viz., the projecting bay, inside which is located a staircase, has made the cottage look so smart in appearance. The building being square in shape and the roof of flat-terraced type, there is no difficulty in construction. As the cottage is designed for a place where there is no subsoil drainage constructed, a w. c. is supposed to be outside the building. If one, however, is to be built, it may be done just outside the cottage adjoining the rear verandah on the right-hand corner.

With brick-in-lime walls, R. C. C. flooring and roof, Shahabad or similar slab paving in all the rooms, glazed windows and plain doors, the cost, viz., Rs. 5,800, is very reasonable. It does not include the price of the building plot, compound wall and fencing, electric fittings and drains.

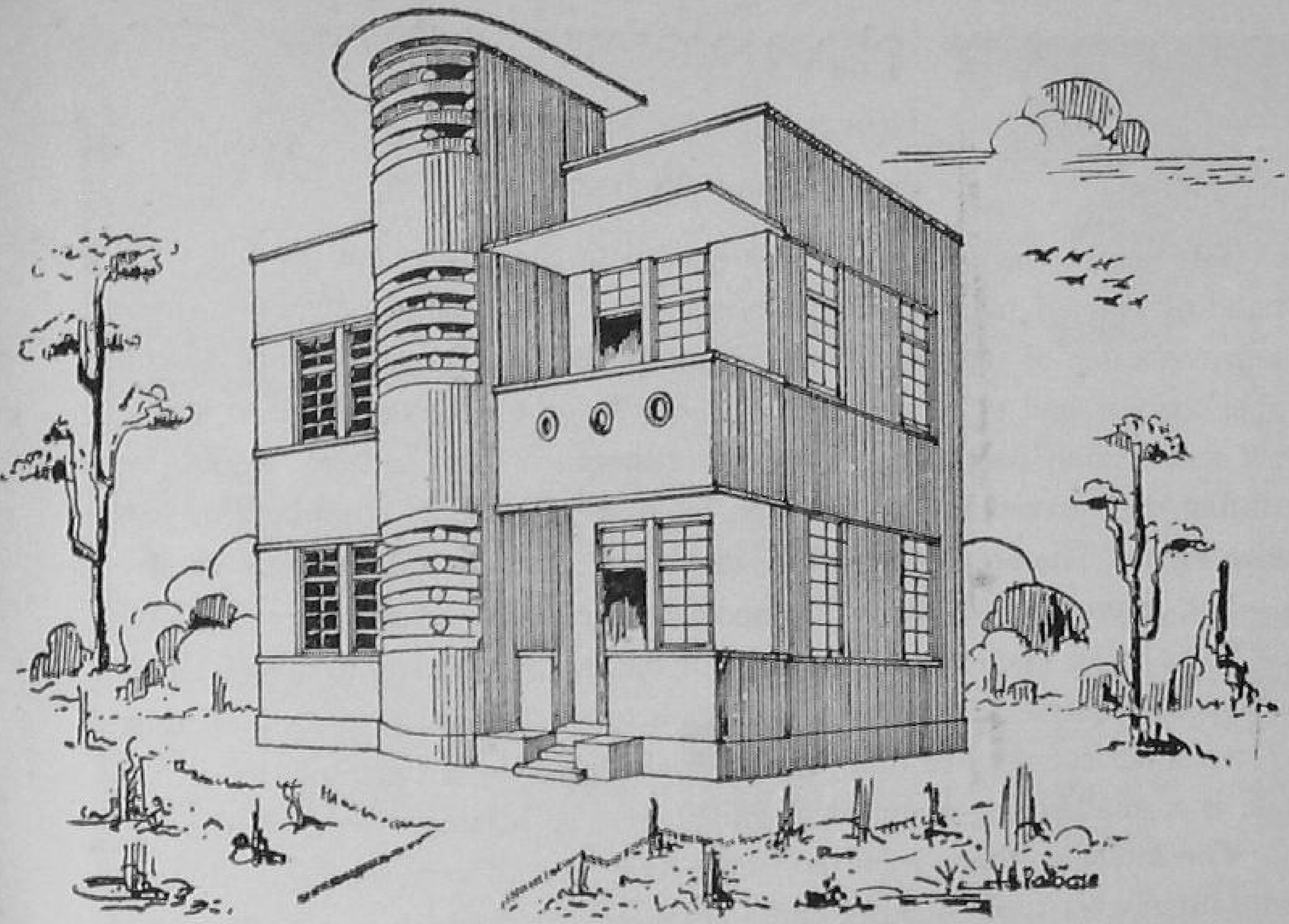


Fig. 144

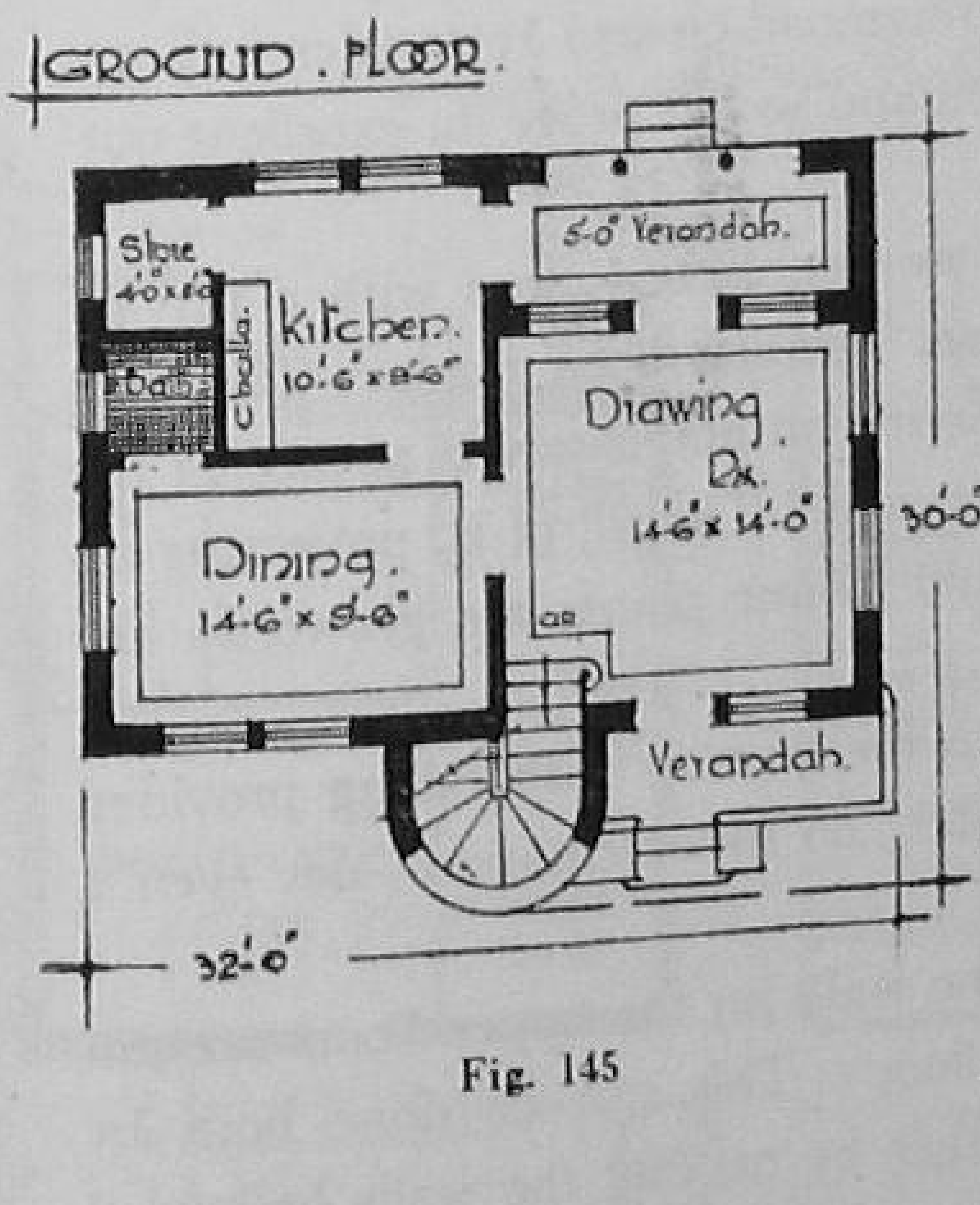


Fig. 145

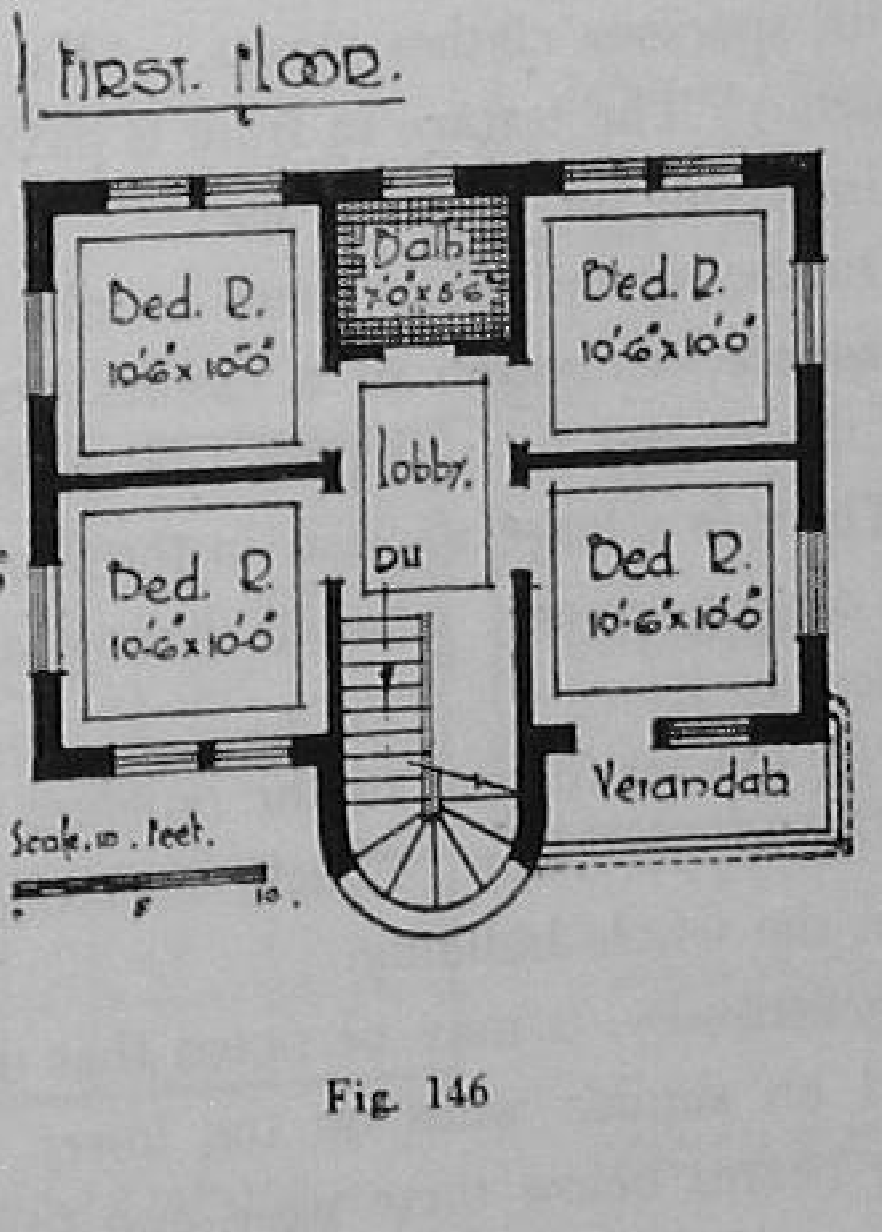


Fig. 146

H. F.—15

PLAN NO. 57

Floor Area: 1,687 sq. ft.

Pre-War Cost: Rs. 6,500

THE writer was very much impressed with the beauty and simplicity of this building erected in Wurzburg, Germany. It was designed by Peter Feile and represents one of the three types of cottages built in staggered lines. Considerable changes had to be made on the rear in the original plan so as to make it suit Indian conditions and social customs. This cottage would be most fitting on a riverside, or a sea-face, or in a hill-station commanding an extensive view. The area occupied by the actual building is only 28 ft. by 29 ft. Yet, it provides all the accommodation needed by a fairly large family.

There is an open terrace in front of the main entrance, to which steps are provided on one side. The entrance leads to a drawing-hall on a luxurious scale for a small cottage like this. On the right hand, by the side of the drawing-hall, is a small sitting-room which might serve as a ladies' room or a spare room. The kitchen, dining-room and bath-room are all very conveniently arranged with respect to each other and a store-room is made by enclosing the space below the staircase. There is a side entrance on the right-hand side, near which is placed a w. c. The staircase is located in a convenient corner so that it is easily and independently accessible from every room or from the outside.

On the first floor, there are three single bed-rooms with one common large bath-room. All the bed-rooms face the west, and they are further provided with spacious clothes closets. (The diamond-crossed rectangles indicate these closets.) The terrace in front is paved and would prove an excellent outdoor sitting-room for common use.

On the second floor, there is only one double bed-room with a private bath attached. Provision of a clothes closet has also been made. The bedroom on the second floor recedes a little, leaving an ample paved terrace in the front. There is a large window in the front wall. The sill of it, projecting on the side of the terrace, is made hollow and flower plants are grown in the earth filled in it.

The special feature of the building is the terraces with railing provided on both the upper floors. There is absolutely no ornamentation—not even a cornice in the whole building.

Incidentally, it may be noted that the walls on the upper floors are not supported on similar walls on the lower floor. This can be done both by providing beams below these walls and further by making the walls hollow of light sheets stiffened by timber frames hidden inside the hollows. The method of constructing such walls is explained in the chapter on Insulation or Heat-proofing on page 100.

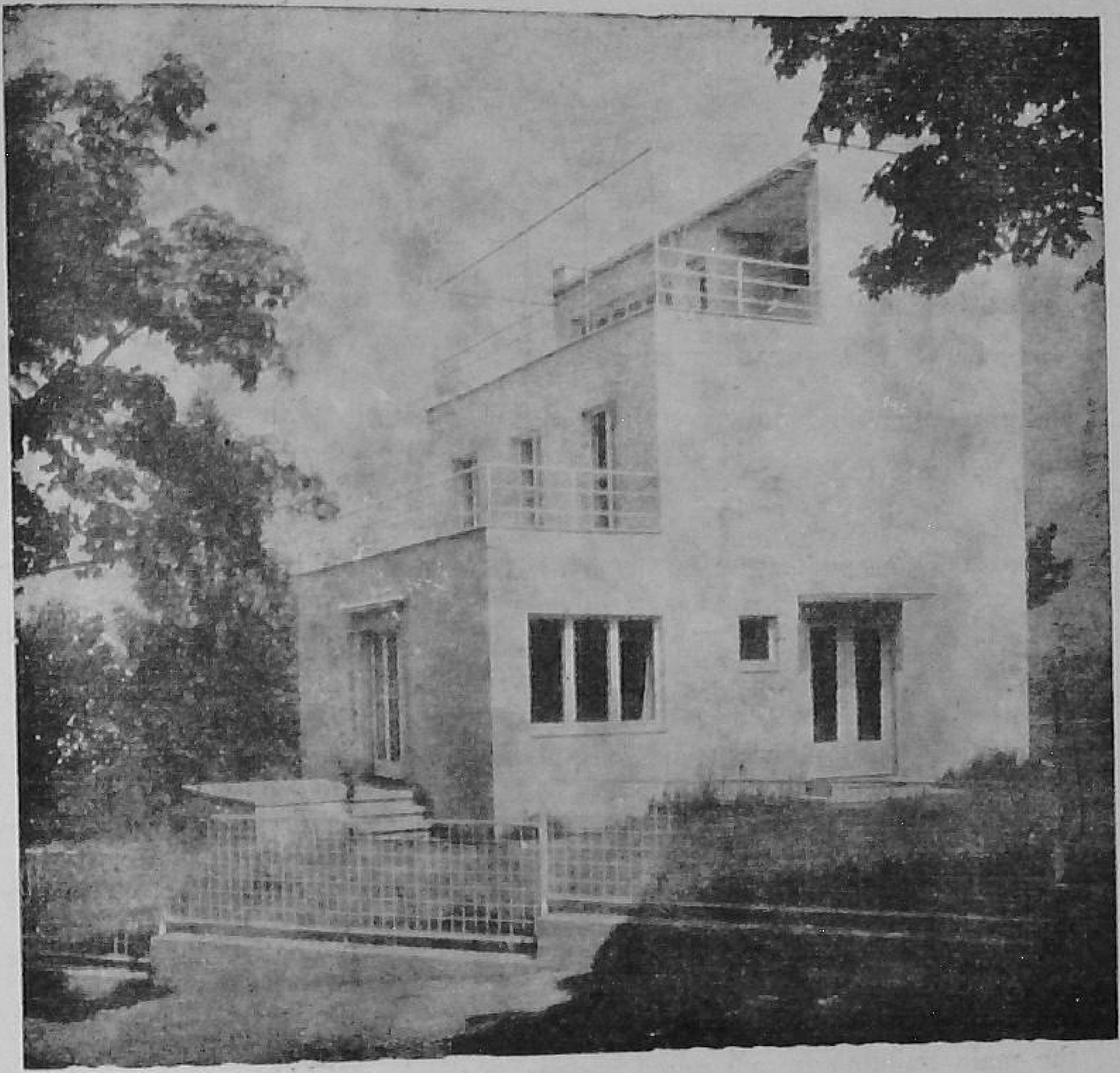
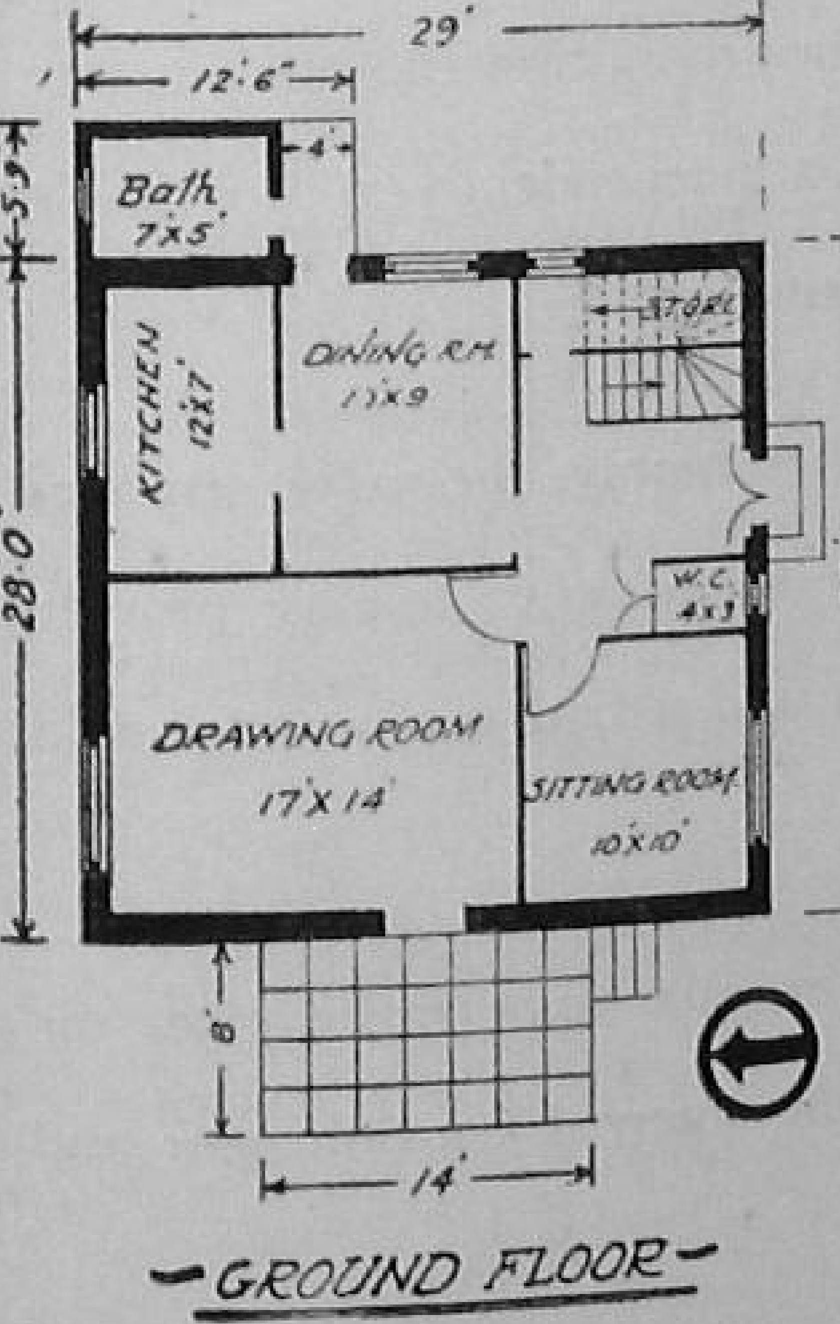


Fig. 147

A Cottage in Wurzburg, Germany. *Architect:* Peter Feile



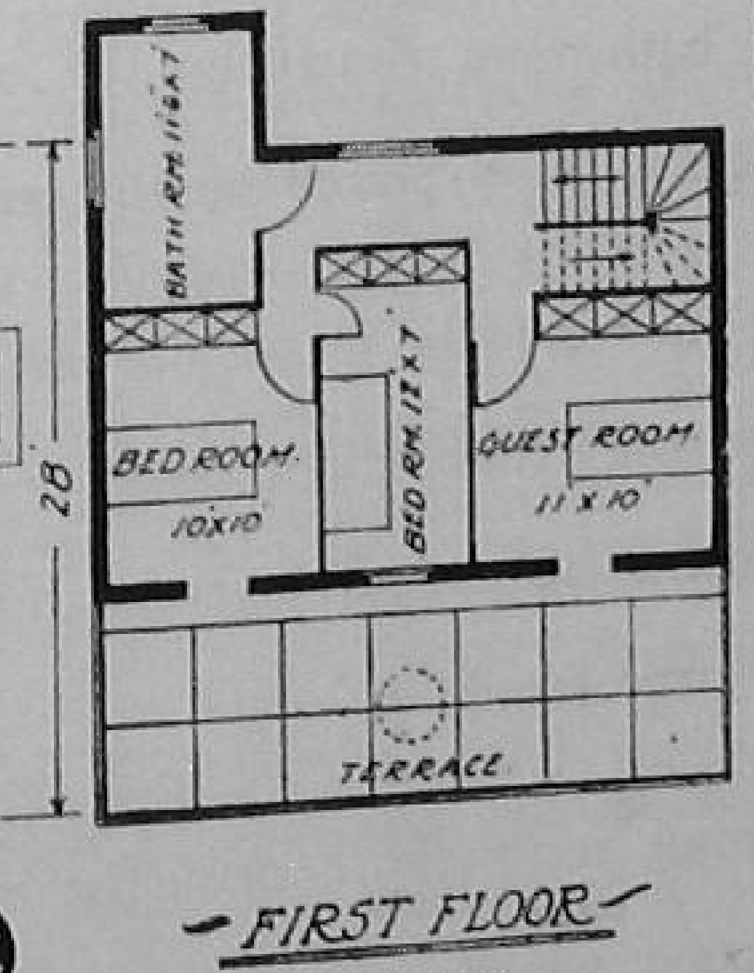


Fig. 148

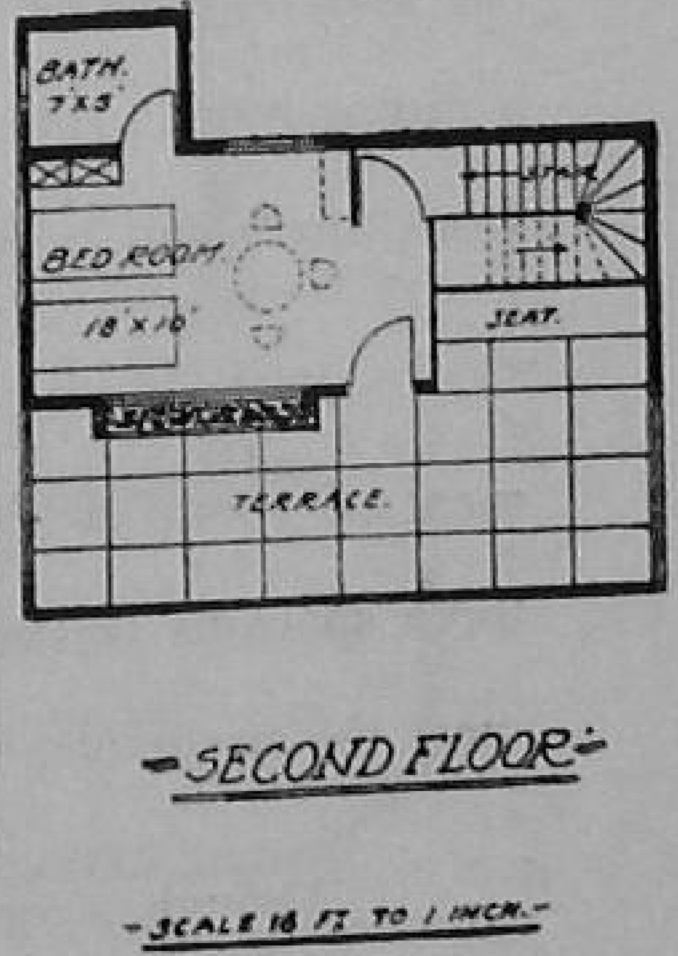


Fig. 149

PLAN NO. 58

Area of Both Floors: 1,940 sq. ft.

Pre-War Cost: Rs. 8,500

This is a very simple but compact, comfortable and very smart modern home which will always remain in good taste. Finely proportioned, with its enduring materials and graceful lines, it will improve with age, being always a home—a sweet cherished home.

The special feature of the home is that it would accommodate either one or even two families—one on each floor. The entrance under a wide sheltering canopy is provided with a collapsable steel gate. Just on the right-hand side a flight of three steps leads one to a spacious attractive verandah with one end curved. Ordinarily this would be an excellent sitting-out place to enjoy the view of the landscape. Behind it is a spacious drawing-room. On the left-hand side there is a kitchen and a dining-room, both of ample size. If a block for a kitchen and store-room is built on the rear side joined to the main building by a covered passage, not only would the house be free from the possible nuisance of smoke and kitchen smells, but it would allow the present dining-room to be converted into a bed-room and the kitchen into a dining-room. The bath-room of 7 ft. by 8 ft. is independently approachable from any room. The w. c. is placed on the outside.

If the upper floor is to be let to a separate family, the same arrangement of rooms as on the ground floor could be made. Or, it may provide three spacious bed-rooms, an extensive verandah and a bath-room and would meet the needs of a large family.

Though a simple rectangle in plan, the external appearance gives the house a rare distinction which, coupled with the internal conveniences and comforts, makes it a really enviable home.

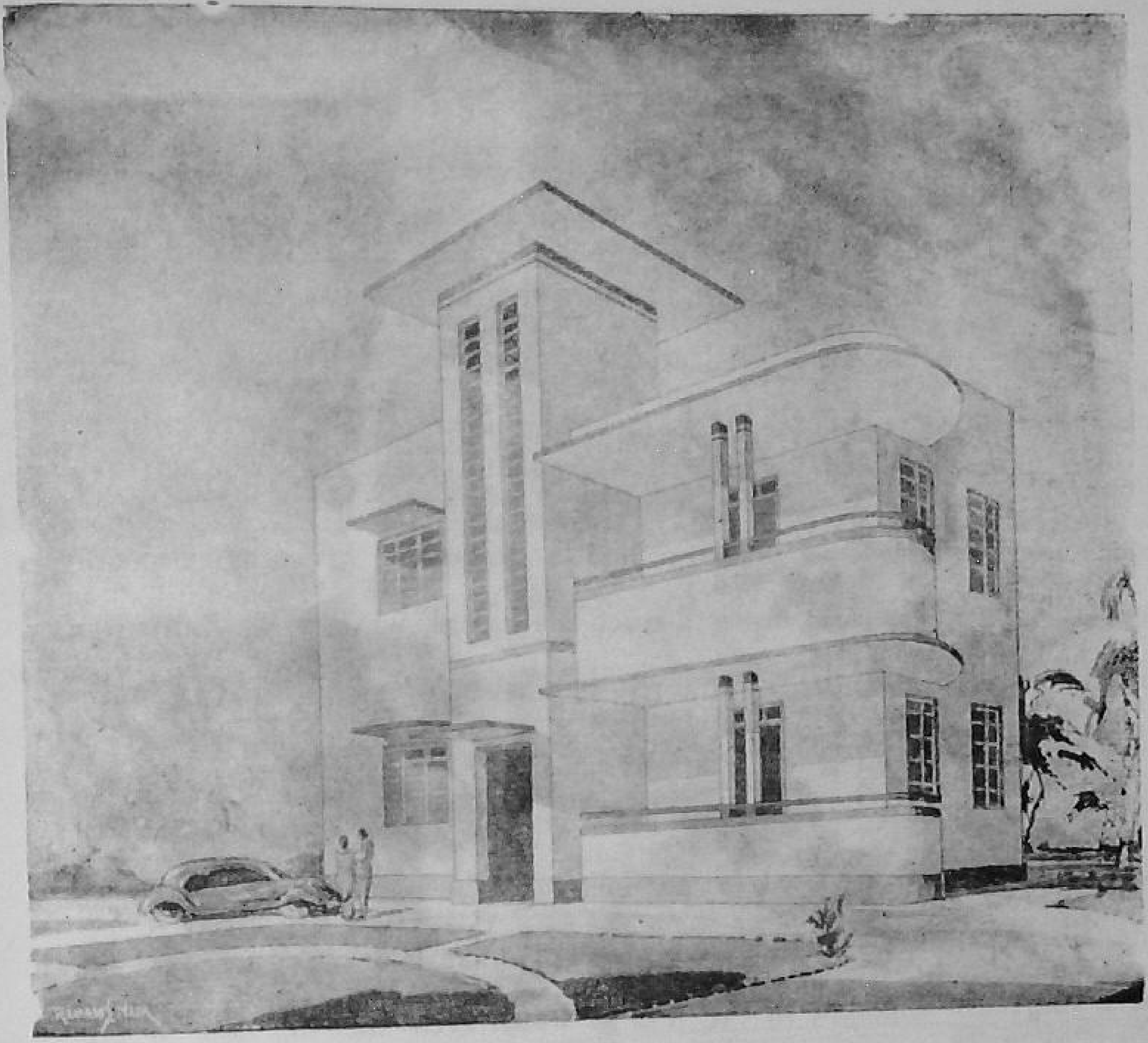


Fig. 150

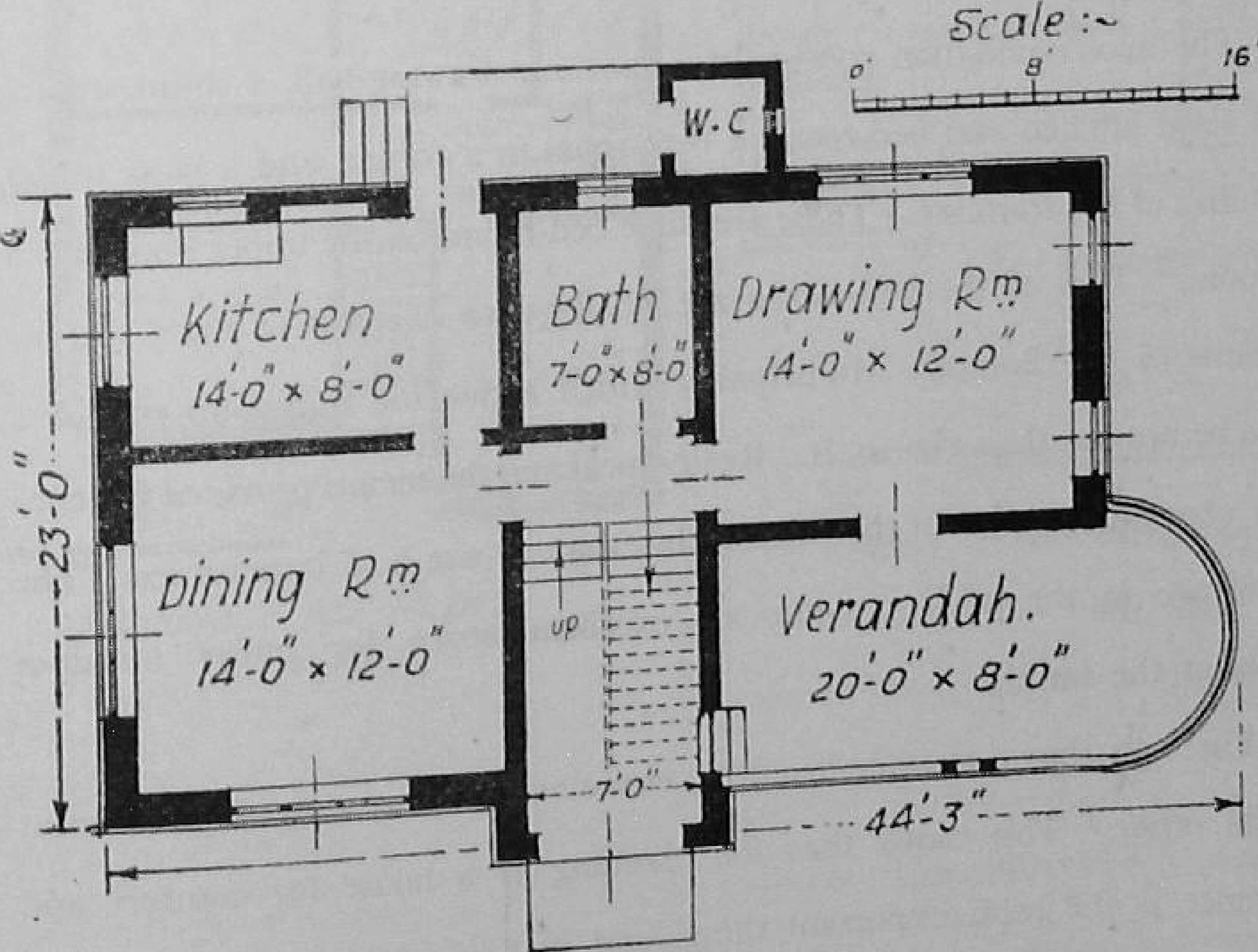


Fig. 151

PLAN NO. 59

Area of Two Floors: 1,955 sq. ft.

Pre-War Cost: Rs. 8,400

THIS is an excellent, compact plan of a medium-sized cottage, in which every single inch of built-up space has been usefully utilised.

There are several special features worth noting, for instance, the garage forms part of the building. This is advantageous in several ways: Firstly, it is economical in construction as it saves at least one wall. Again, the area to be roofed over is smaller than if it were built as an isolated structure. Secondly, it saves several footsteps in order to reach the garage, which is very important when it is raining. Thirdly, if a flat roof is provided over it, it could be utilised as a terrace, and so on. The wide corner windows on both the floors, besides serving as excellent means of light and ventilation, have contributed to the charm of the exterior. The horizontal lines of the flat roofs over different rooms are so arranged at different heights that there is an effect of terracing. This is markedly apparent in Fig. 152 in which even the top line of the compound wall forms the lowermost terrace.

The accommodation consists of a spacious drawing-hall, a dining-room, a good sized kitchen and bed-room, a bath-room in a corner, and a w. c. under the landing of the staircase. There are three bed-rooms on the upper floor and a toilet-room. Two of the bed-rooms are small—of a size just to meet the requirements of the Bombay Municipality which allows the minimum size of a room to be not less than 100 sq. ft. Really speaking, the means provided for continually changing the air in the room rather than its size is of importance. The large terrace in the front provides an excellent space for many out-door activities of the family.

Fig. 153 shows another beautiful elevation which is altogether different from the other. This shows that the planning of a house for comfort and convenience is the most important thing, and if it is good, a skilful architect can give it any desired effect.

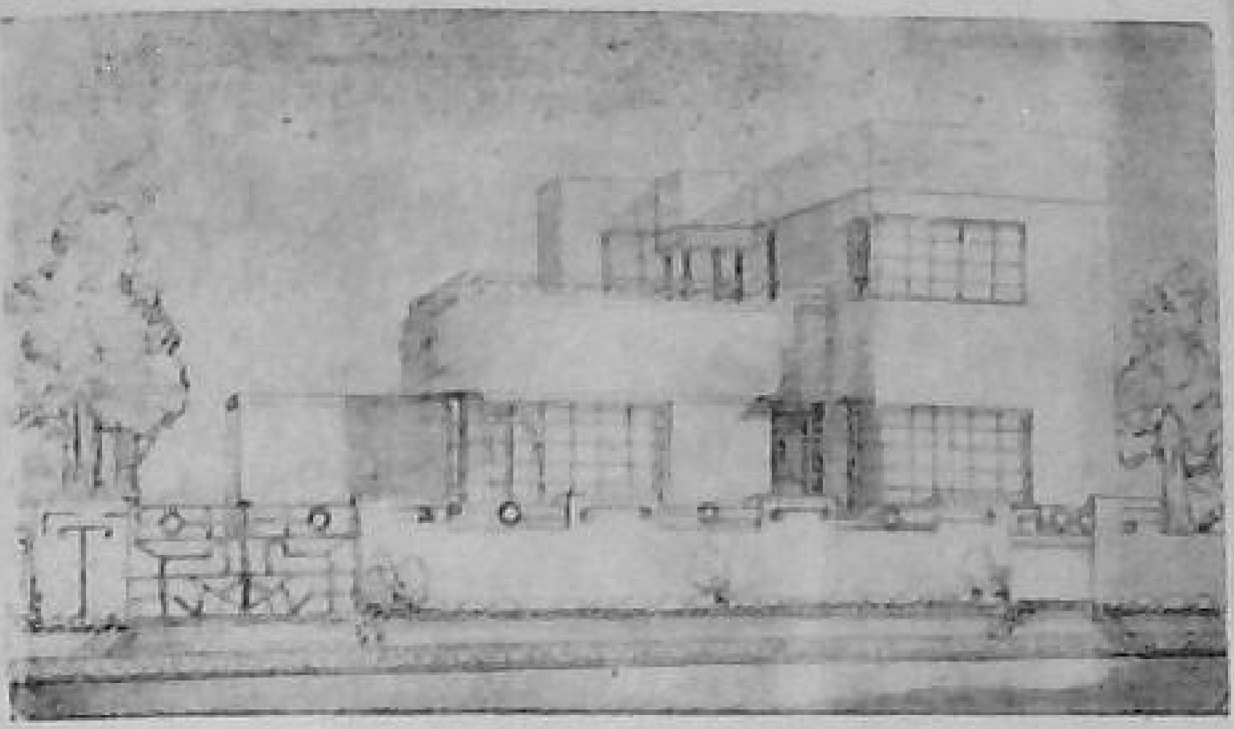


Fig. 152

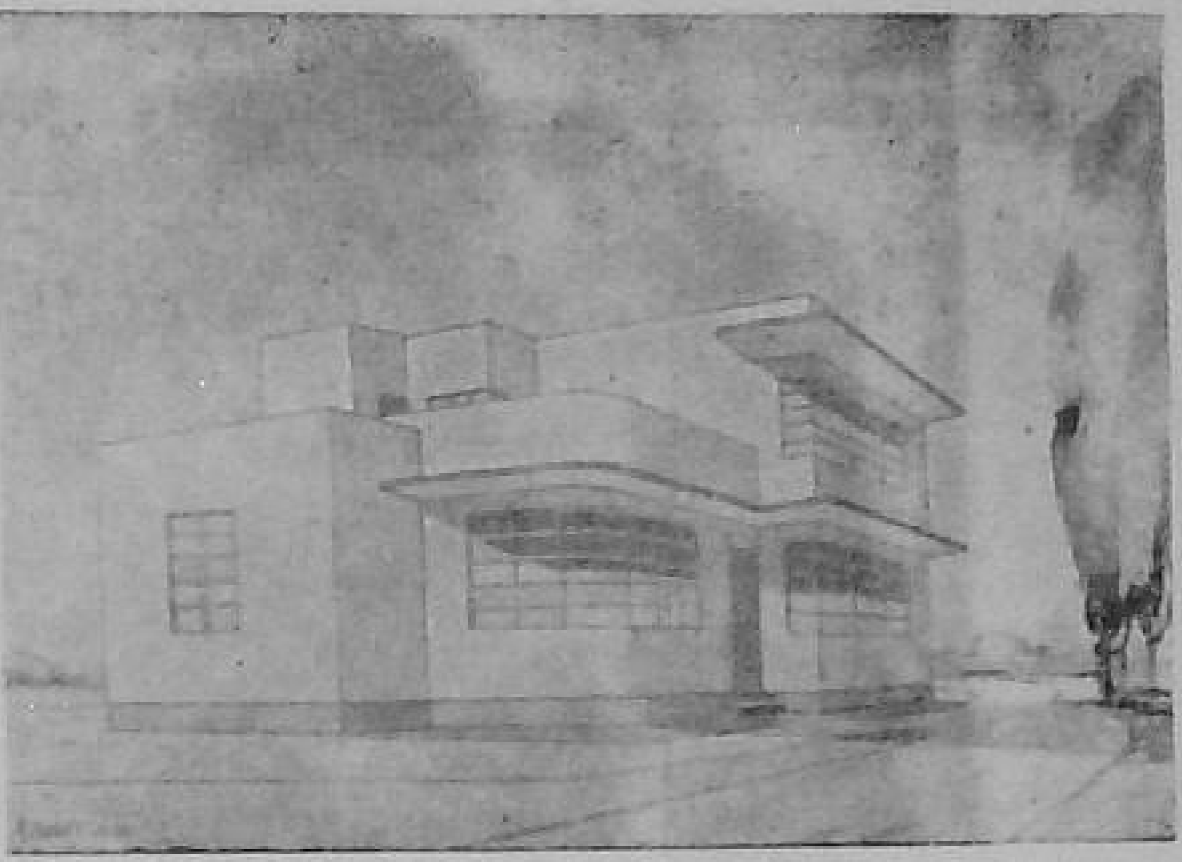
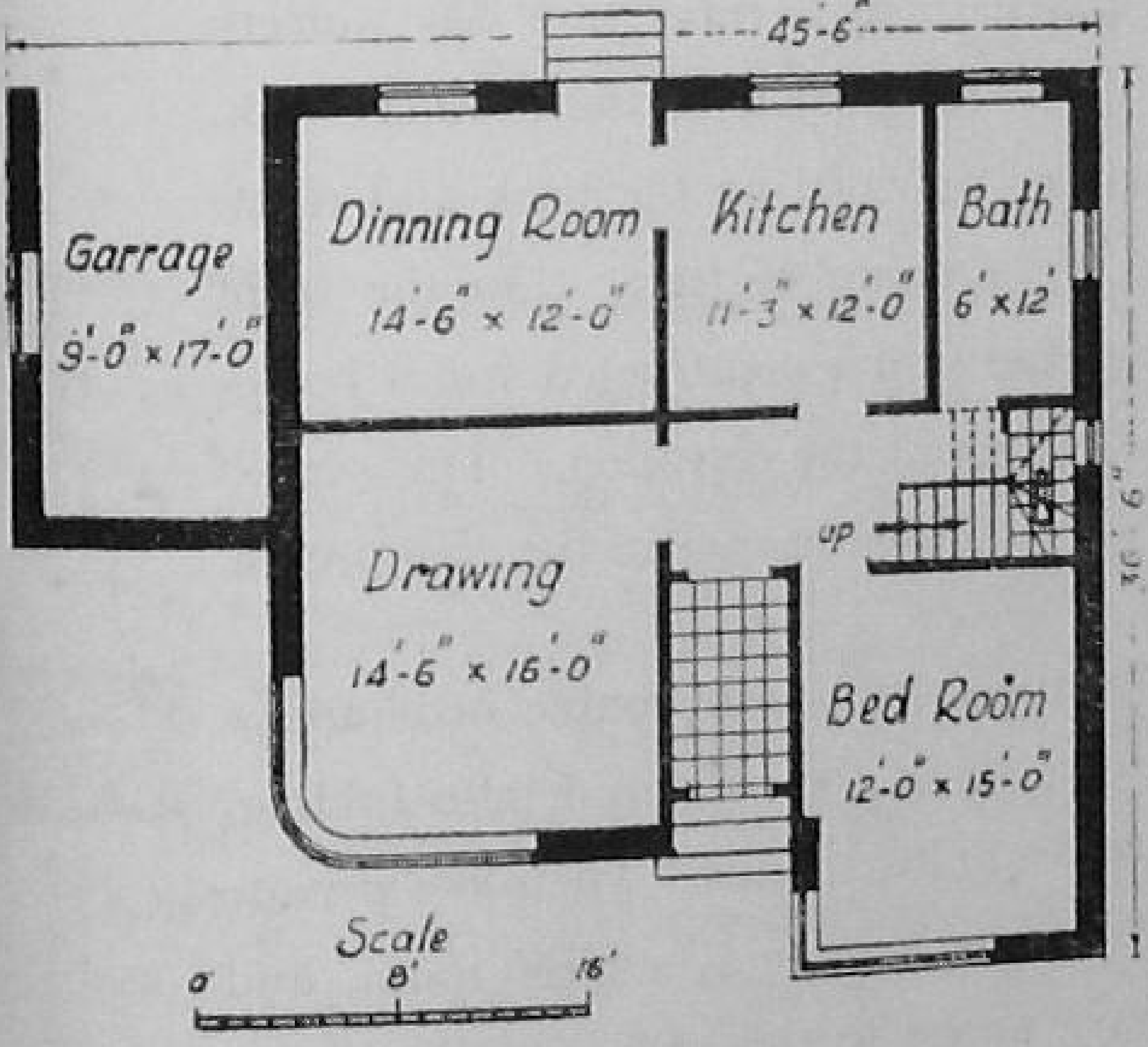
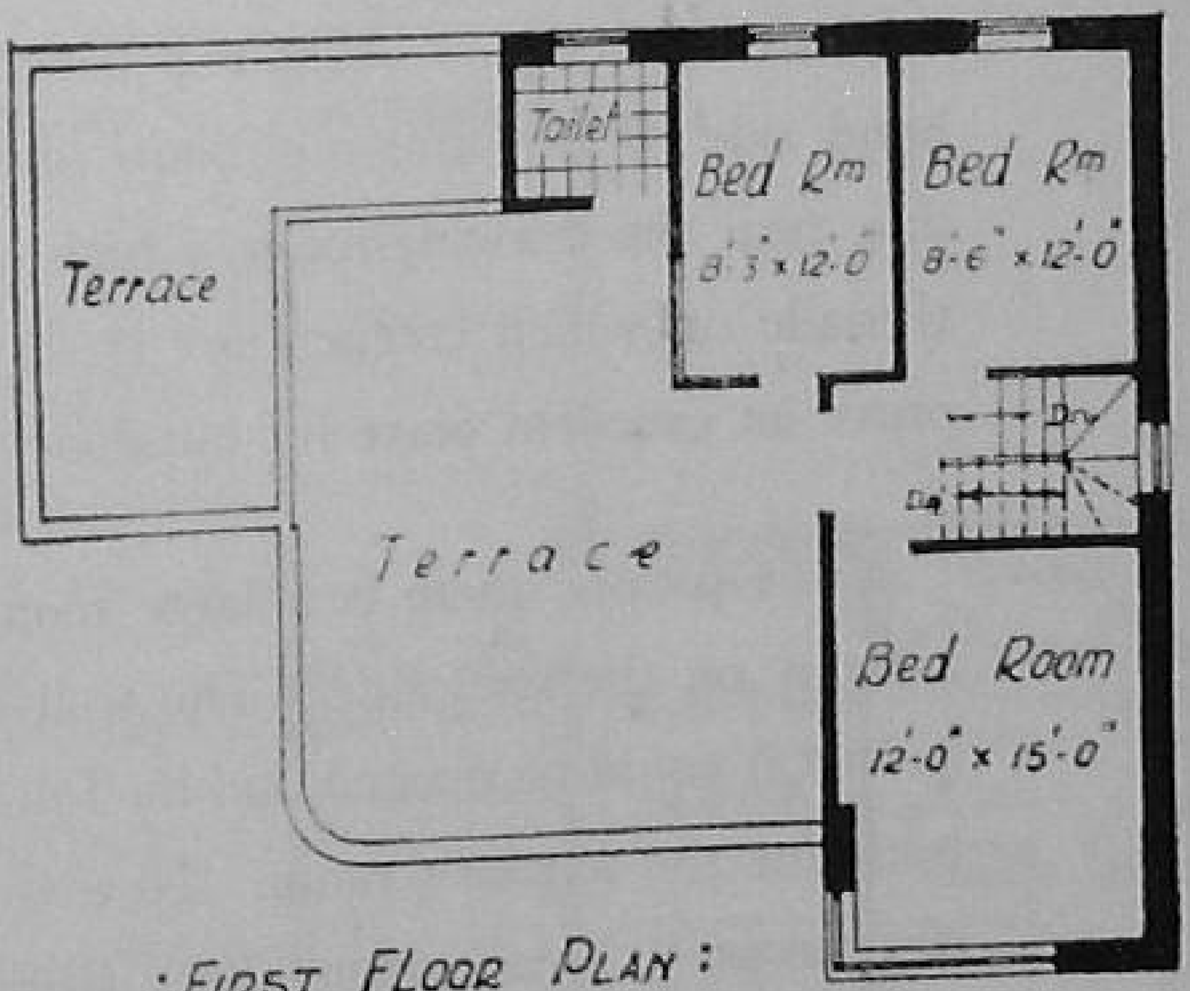


Fig. 153



: GROUND FLOOR PLAN :

Fig. 154



: FIRST FLOOR PLAN :

Fig. 155

PLAN NO. 60

Floor Area: 2,160 sq. ft.

Pre-War Cost: Rs. 7,200

THIS is one of the simplest and most convenient buildings. The main building itself covers an area of 36 ft. by 28 ft. only. In front of the entrance is a verandah in the form of a staircase hall 12 ft. deep. On the right-hand side of it is a long and narrow drawing-room and behind the staircase hall is a good sized, almost square room for dining. But all these three rooms are connected by folding partitions in such a way that when necessary, they can all combine and form a large hall of 24 ft. by 25 ft. Such folding partitions may be either of wood or patent composition sheets, of which there is a large variety in the market. They are in the form of panels hinged together so that they can be folded like a pack of cards. Sometimes, mechanical gears are employed for opening or closing them. The kitchen, store-room and bath-room are all conveniently arranged on the left-hand side. Beyond the kitchen is a well lighted and ventilated paved room to serve as a day nursery and play-room for children, under the direct supervision of the mother working in the kitchen. There is a paved terrace provided on the back and right-hand side of the drawing-room, shaded by a group of trees. On the front side, near the drawing-room, a high compound wall is constructed and a bower is made on which creepers are trailed as shown in the elevation. This would prove an excellent place for out-door dining or sitting at ease in the cool breeze.

Upstairs, there is a large room for the master with double beds and a balcony on the west side. The wall on the side of the balcony is also folding, so that it could be opened and the full breeze admitted inside. There is a private bath for the master's room. Next to the master's room is a girls' room, and next to it, a boys' room. Both these have access to the open terrace on the rear side on the west. There are two closets and a bath-room common for the two rooms.

The elevation is devoid of all ornamentation and is conspicuous by its simplicity. The construction is quite simple. There are no projections nor recesses in the plan.

An eastern or north-eastern aspect is suitable for the building.

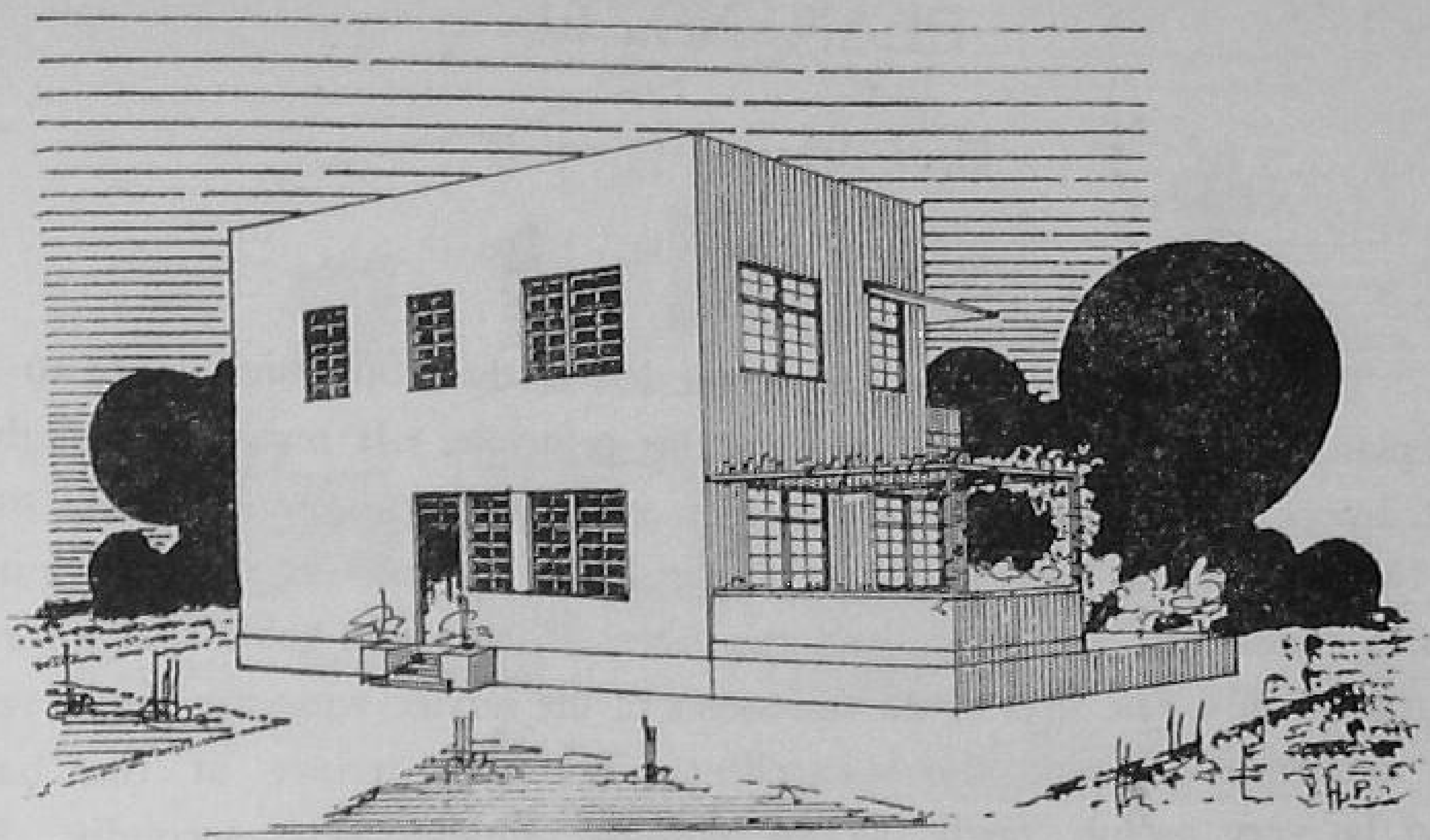


Fig. 156

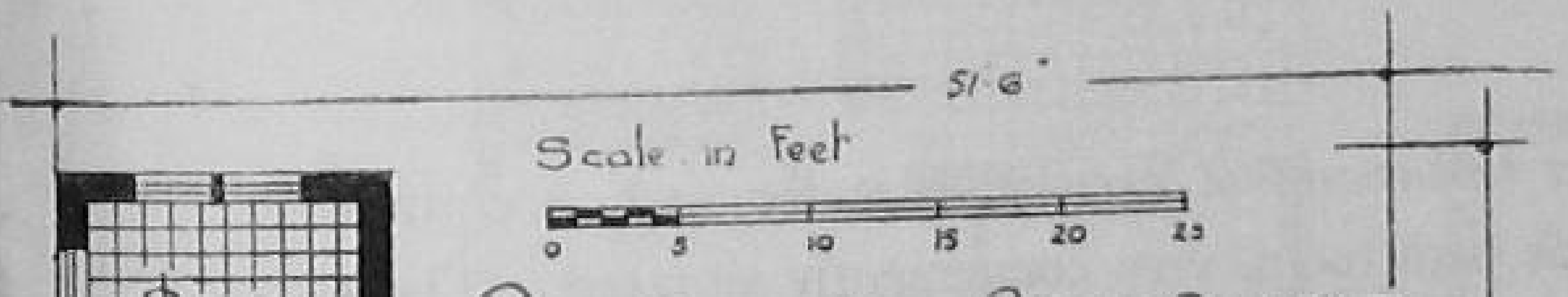


Fig. 157

Fig. 158

PLAN NO. 61

Floor Area: 2,177 sq. ft.

Pre-War Cost: Rs. 7,250

THE nearer the cube in shape, the less costly a building is sure to be. The plan of this building is based on this principle. It measures, roughly, 35 ft. by 35 ft. The staircase serves as an axis, dividing the ground floor area into two parts: one, service centre, comprising a kitchen, store-room, dining-room, a bath-room and w. c., and the other, on the right-hand side, of rest and recreation. The sizes of all the rooms in the service wing are really very good and their grouping also is excellent. The open terrace at the back would be very useful, firstly, as an out-door dining-room; secondly, for children at play; thirdly, for rest and relaxation in the open air amidst the little family circle, forgetting the worries of the day; fourthly, for any social function for which the drawing-hall, which, though spacious enough, would be found too small. When the folding partition on the rear side of the drawing-hall is opened, the open terrace becomes part of the large drawing-hall. The 7′ 6″ wide verandah would amply meet all the requirements expected of it. The staircase is wide enough and has an easy climb, with only one flat landing in the full length.

Upstairs, there are four bed-rooms of excellent size for such a cottage of medium size, with a spacious bath-room, very conveniently situated. There is a balcony on the rear side, through which there is an approach to the terrace. The largest bed-room is of 12′ × 15′ size and would be very convenient for the master of the house to occupy. Clothes closets have not been shown, but there is ample space for them in every room.

Perhaps it is likely that provision for too many windows might cause a glare which is detrimental to rest. Either the number of windows may be reduced, which would also reduce the cost, or blinds may be provided to cover part or the whole of the window surface, as and when necessary.

For such a plan, with bed-rooms on all four sides, it is difficult to prescribe the proper orientation. But, in the present case, a north facing would be very suitable. In that case, the kitchen would be in the north-east direction and, in that position, all the smoke and smell from that room would go away from the house.

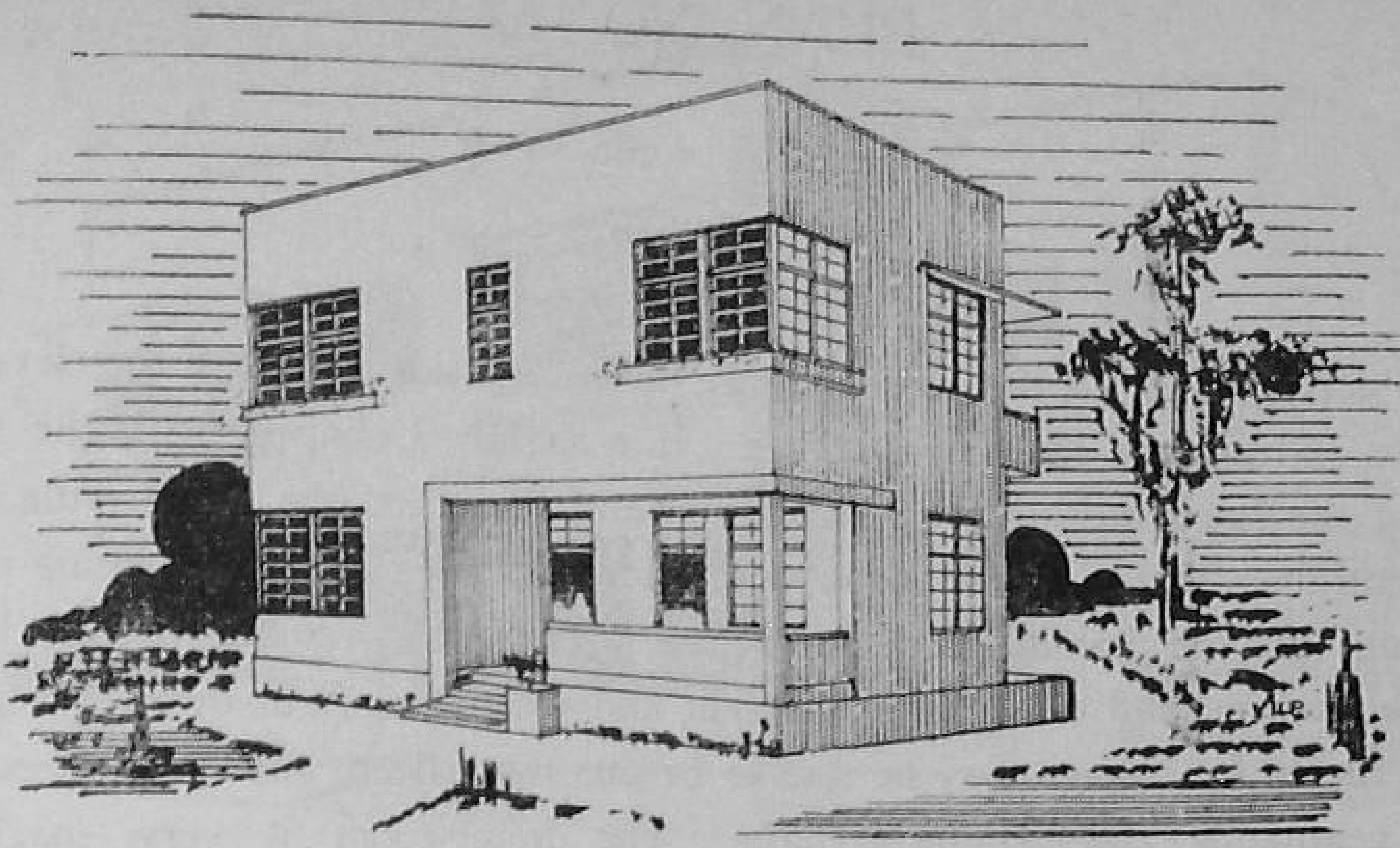


Fig. 159

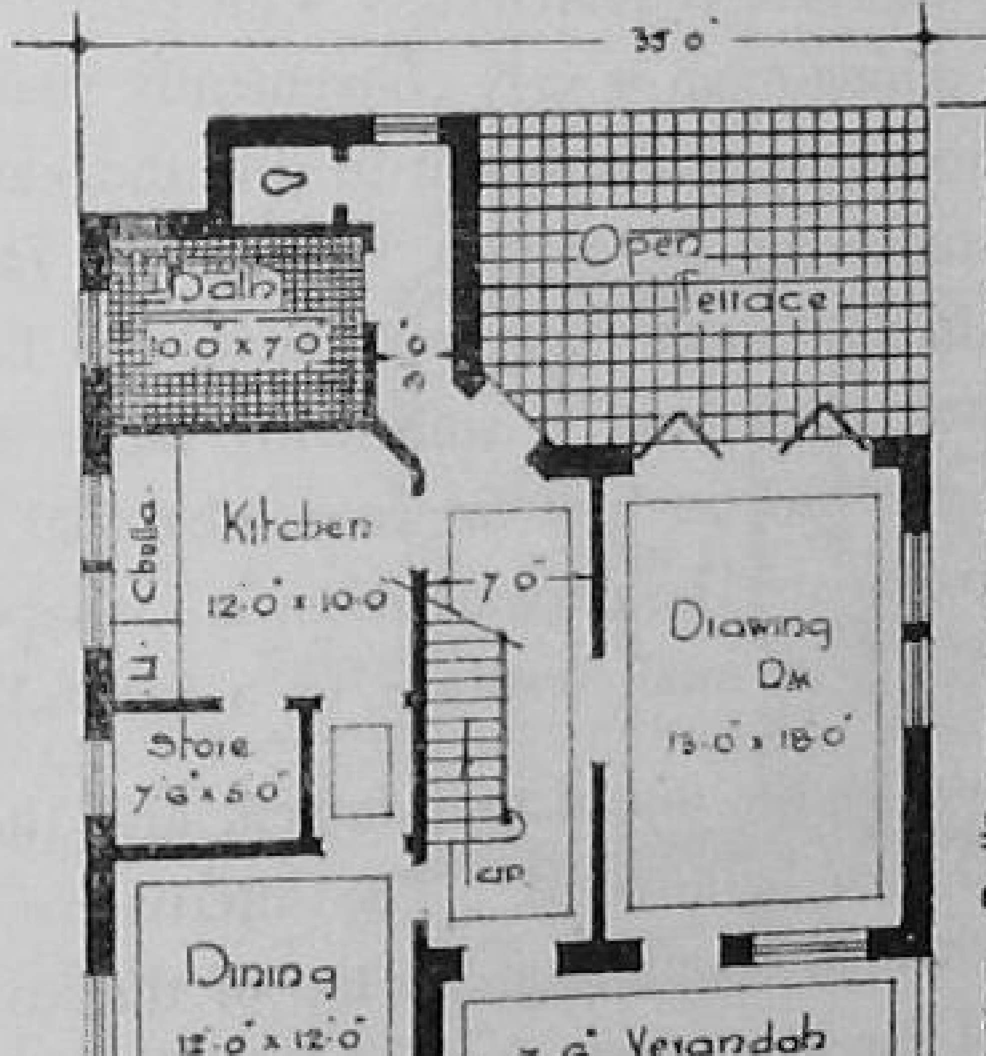


Fig. 160

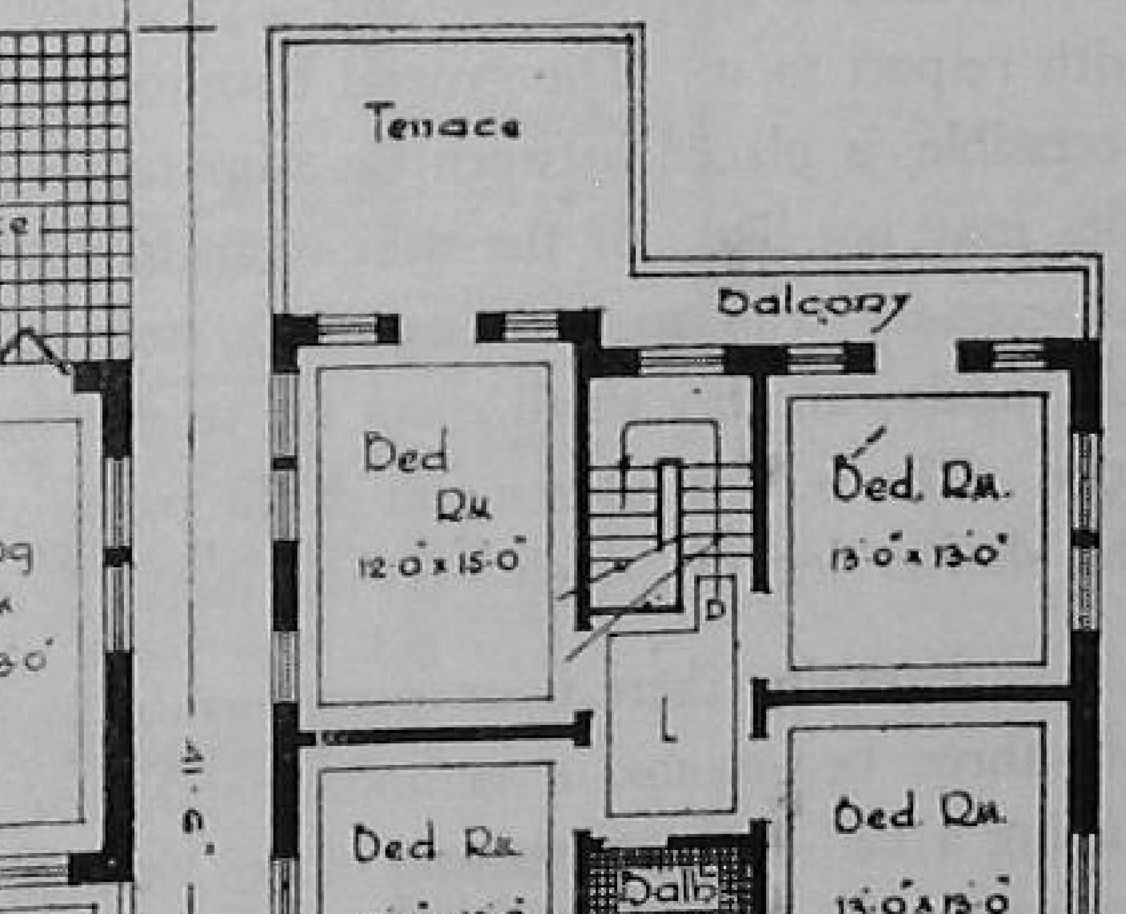


Fig. 161

PLAN NO. 62

Floor Area: 2,269 sq. ft.

Pre-War Cost: Rs. 7,490

THIS plan has the main entrance on the east side, although the elevation drawn is from the south-west corner. It is slightly L-shaped, with the short leg of the L comprising the service wing and the other, the living wing. At the entrance, there is a verandah 7 ft. wide, which leads to the dining-room in front and the drawing-room on one side. The latter occupies the full depth of the cottage, and thus commands light and ventilation from three sides. In fact, the entire cottage may be said to be one room deep, and it possesses the best ventilating and lighting facilities. The dining-room is very spacious. The staircase occupies a most central and convenient position, so that it can be independently reached from any room. It consists of two straight flights of steps joined by a semi-circle and, as such, it is more artistic, but from the point of view of convenience, two straight flights joined by a straight, flat landing, without any winding steps, are always to be preferred. (Vide page 67.) The kitchen is spacious and the large dining-room is very conveniently placed with respect to it. The general bath-room, though sufficient in size and easily accessible, is placed between the store-room and the kitchen, which some families may not like. If the store-room is close to the kitchen, it saves the lady unnecessary trips to and fro. The store-room itself is sufficiently large and has, again, another small room for storing fuel, such as firewood, charcoal, or coke. The w. c. is at one end of the passage. The drawing-room is L-shaped, the shorter leg of which may be useful as a small vestibule or a verandah.

Upstairs, there is an open terrace on the top of the kitchen, and there are three bed-rooms, a verandah and two bath-rooms. The alternative of having a bed-room on the top of the kitchen, a bath-room on top of the lower bath-room and a terrace on the top of the store-room, fuel-room and part of the verandah, would be better. Because, in that case, all the bed-rooms would be in a straight line and the benefit of the terrace would be derived by all of them, instead of by only two as at present. The bath-room also in that case would be independently accessible and could be used in common by the occupants of the two smaller bed-rooms, leaving the one behind the staircase for the exclusive use of the master occupying the larger bed-room. The building has only one projection and all corners are square. There is absolutely no space wasted. The orientation shown would be even better for the alternative plan of the upper floor suggested above.

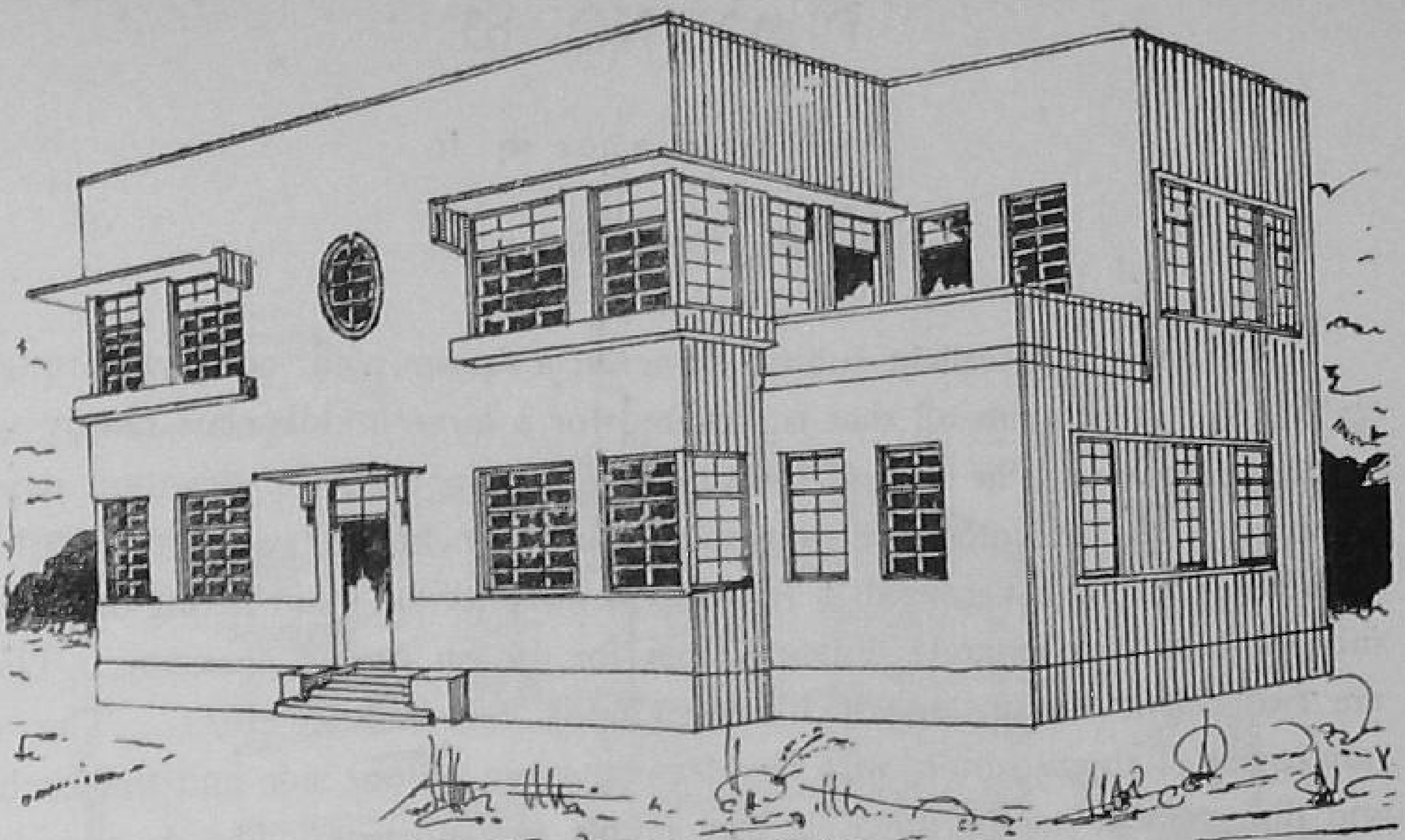


Fig. 162

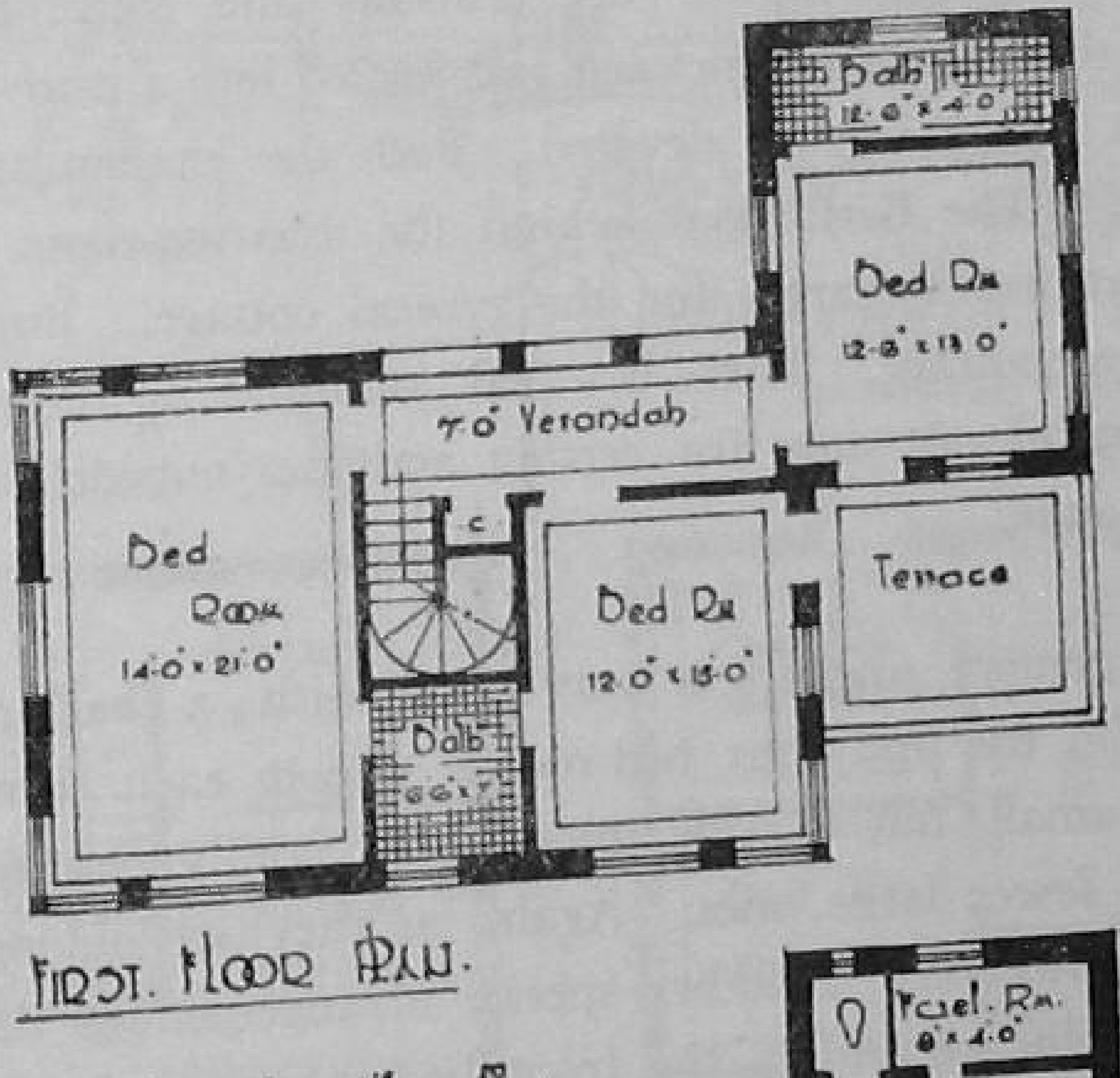


Fig. 163

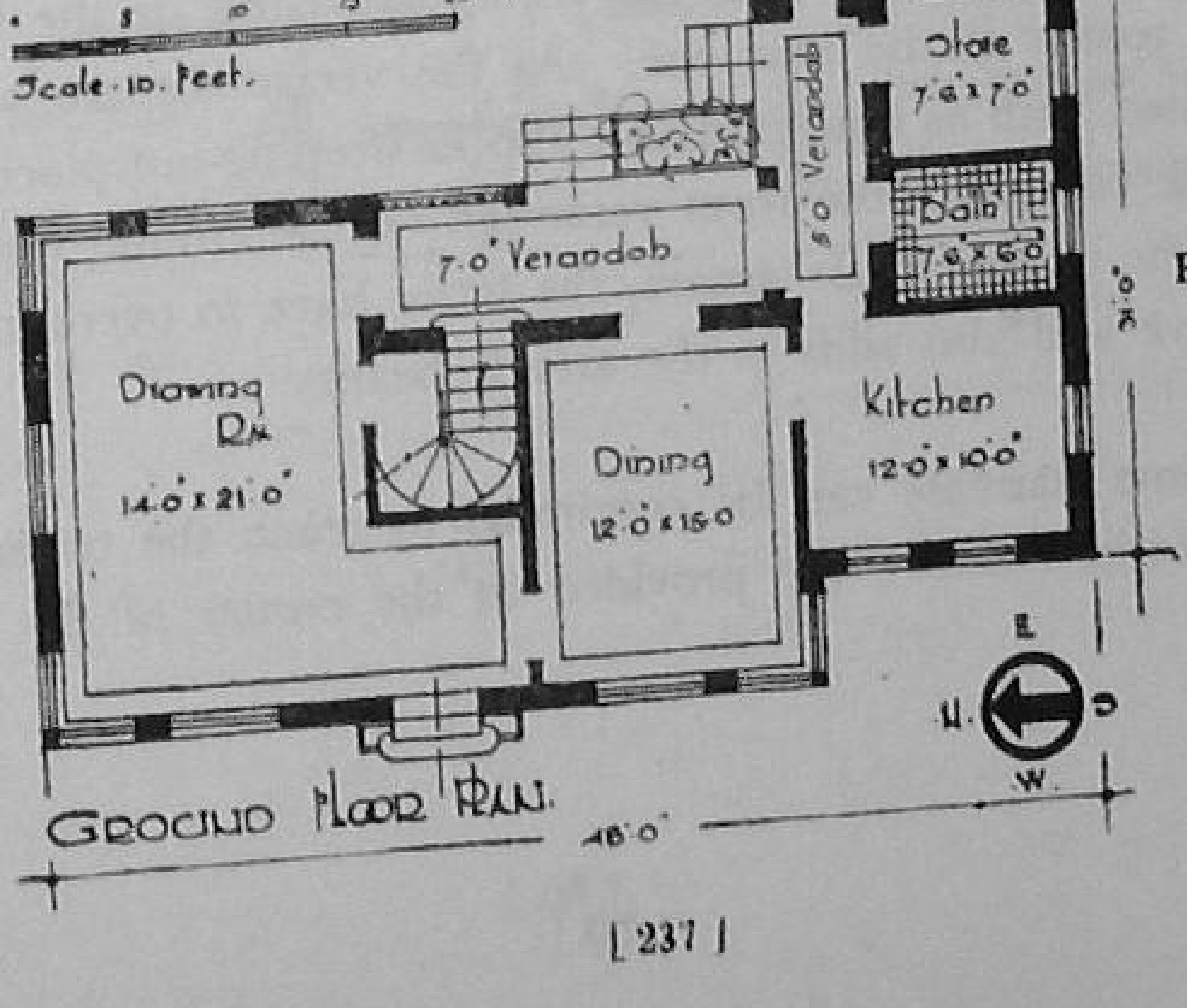


Fig. 164

PLAN NO. 63

Floor Area: 2,302 sq. ft.

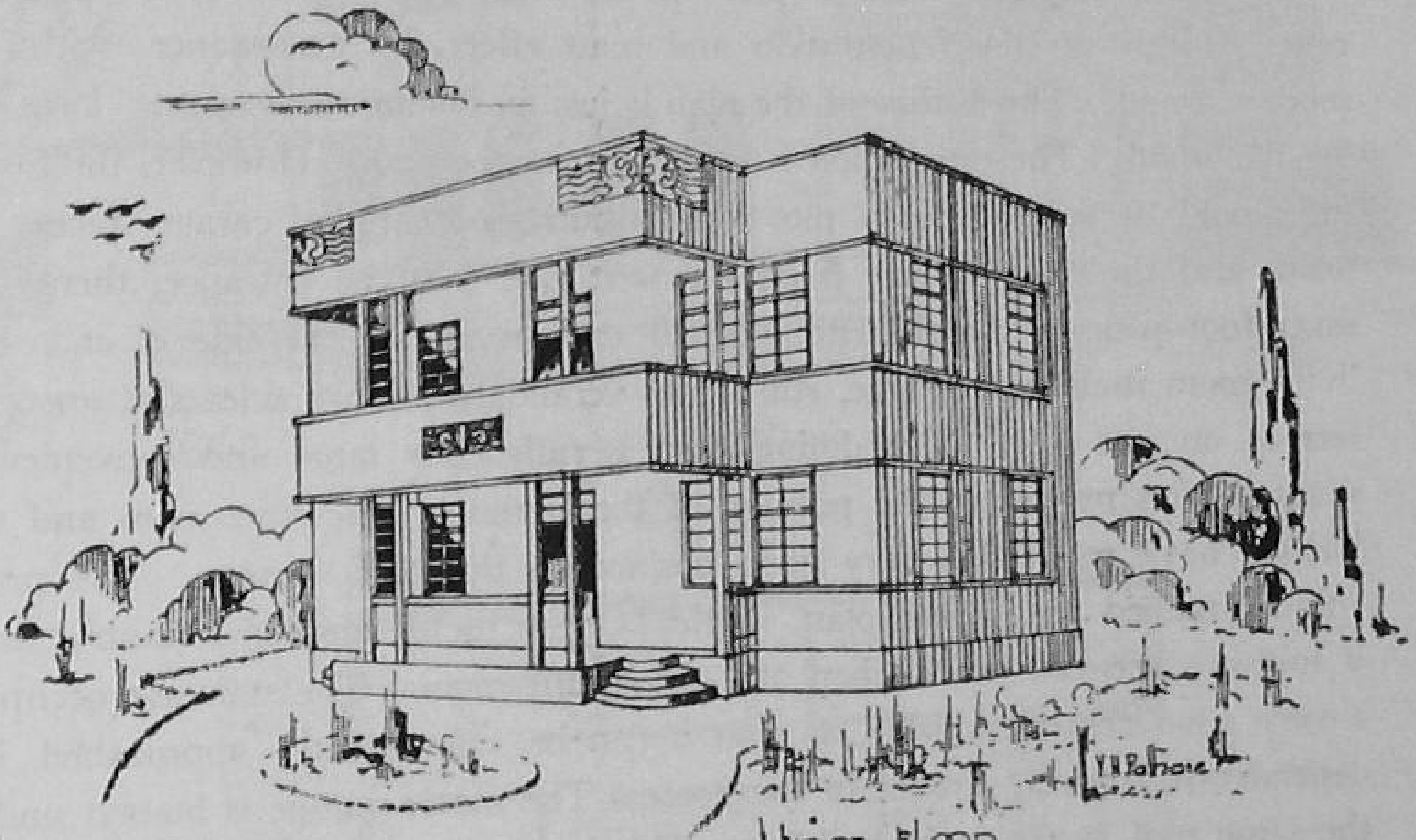
Pre-War Cost: Rs. 7,520

THIS is an excellent cubical home on a square plan, occupying roughly 37′ × 36′. It contains all that is required for a large middle-class family with moderate means. The style is the simplest possible: still, the elevation is very attractive and the interior arrangements fully synchronise with the outside beauty. There is a verandah 8 ft. wide to serve as the main sitting-out place, though there is a separate drawing-room for use on formal occasions. There are two corner entrances, which are rounded for artistic effect. The arrangement of rooms inside, with the drawing-room on one side and the kitchen and dining-room on the other, is very simple and efficient. The drawing-hall might perhaps be deemed small, particularly as it is nearly a square room. The staircase is in one straight flight, very centrally and conveniently arranged. The space below the staircase is enclosed and turned into a store-room for which latter there is no separate space devoted. Both the kitchen and dining-room are large enough. The bath-room behind the drawing-room is very large, perhaps disproportionately large, for the typical cottage. But a large bath-room is often an advantage. There is a 6 ft. verandah on the rear side, which would be very useful not only for certain activities outside the kitchen, but also for sitting at ease.

The arrangement upstairs is very good with a bath-room centrally placed for common use and four bed-rooms, one in each corner. The bed-rooms are rather small, but a large middle-class family requires rather more small rooms than fewer large ones. Again, as they are oblong in size, they would be more serviceable. Another special arrangement is that every room gets the benefit of the verandah, the front bed-rooms of the front verandah, and the rear rooms of the rear one. As the verandahs are sufficiently wide, they can be used both as balconies and also as sleeping-out places on hot, sultry nights. As the corners of the front verandah on the ground floor are rounded, and those of the upper, made square, the latter have to overhang a little. But it is inexpensive and also adds to the artistic beauty.

The same staircase can be continued to reach the terrace roof. Concrete *jalies* (latticed slabs) are provided in the corner of the parapet walls.

Fig. 165



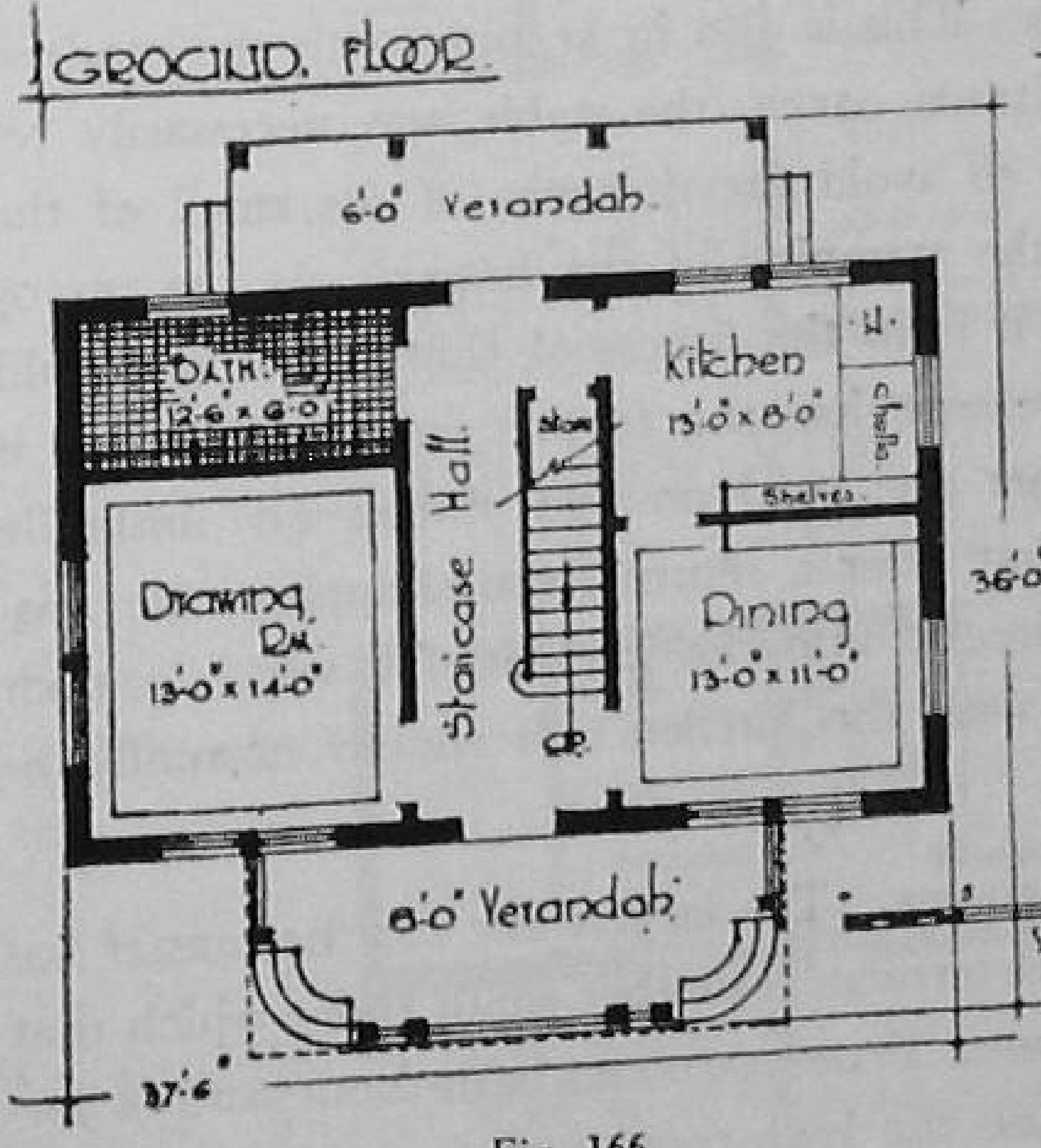


Fig. 166

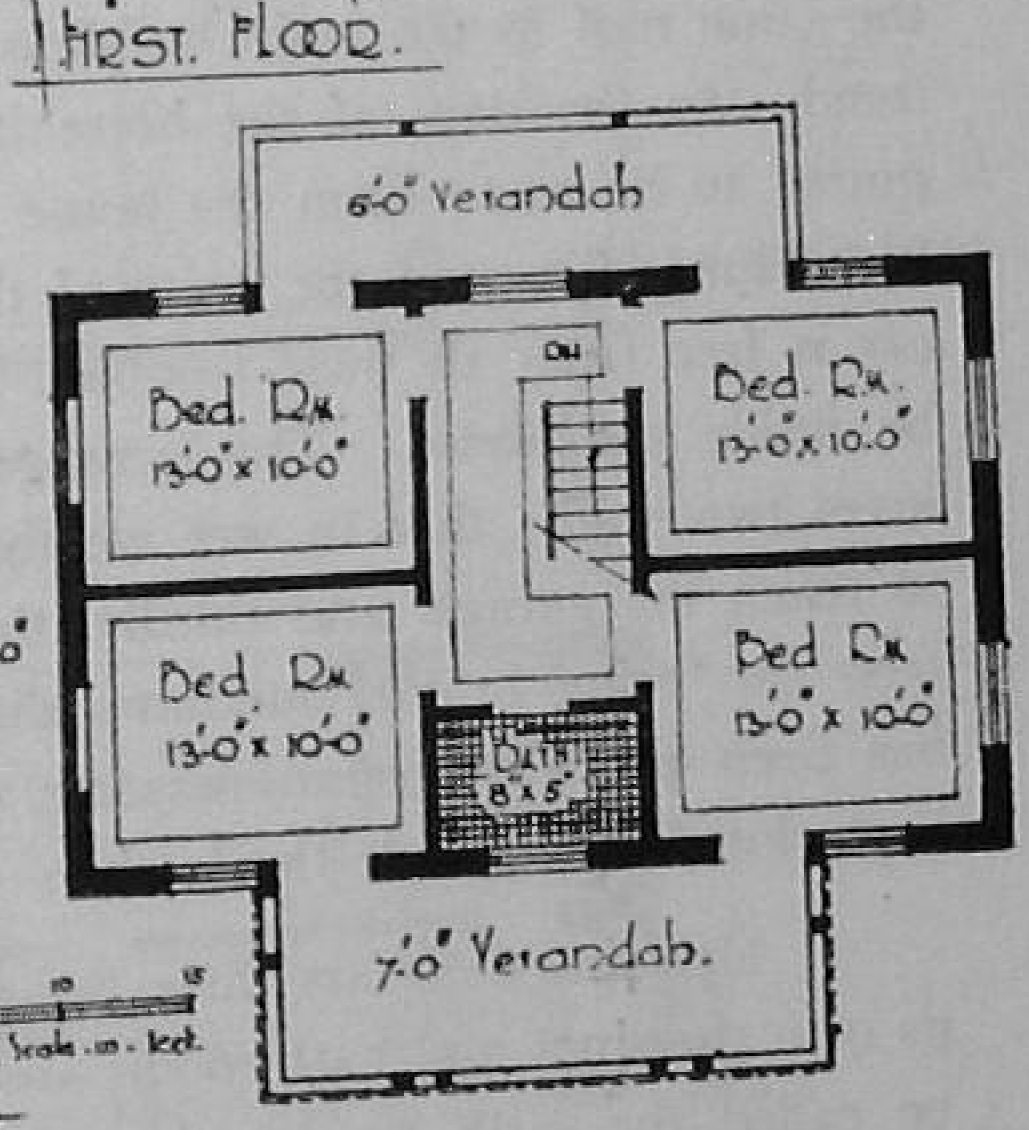


Fig. 167

PLAN NO. 64

Floor Area: 2,326 sq. ft.

Pre-War Cost: Rs. 7,600

This cottage, which is plain in its outline and in exterior treatment, relies entirely on the fenestration and mass effect, in accordance with the modern trend. The outline of the plan is just an oblong rectangle 53′ long and 26′ 6″ broad. The orientation is not shown in the plan. However, the building would be suitable for a plot facing south, so that the garage faces the north and the open terrace is on the west side. At the entrance, there is a seven-foot wide verandah with a small study-room on one side of it. The living-room itself is not large, still it has verandahs on two sides and an open terrace on one side. The dining-room is sufficiently large and conveniently situated with respect to the position of the kitchen. The store-room and the kitchen have received a very good position in the N.-E. corner. The small cubicle, named box in the plan, would be very useful even as a pantry, as it is midway between the kitchen and the dining-room. The staircase occupies a very good central position, so that it can be conveniently approached independently from any room in the home. The motor garage is housed under the same roof as the main building. This is also in keeping with the modern trend. In the days of the horse-drawn coach, the stable was necessarily required to be away from the house to avoid the nuisance of the smell of the horse-dung, flies and the noise of the tramping of the horses. As the motor car is free from all these troubles, it is in the fitness of things that it should be inside the house. This arrangement has the further advantages that it saves two walls; that in wet weather one need not go under an umbrella to reach the garage, and thirdly, that after a return from shopping, the mistress can bring in the purchases directly into the kitchen, for which a door has been provided communicating with the kitchen. It should normally be kept closed from inside the kitchen.

Upstairs, there are three bed-rooms. The largest one for the master has its own dressing- and bath-rooms and terrace. Another small room which may be called the girl's boudoir has also a dressing-room, bath-room and a terrace attached to it. The boy can use the bath-room and terrace in common with the girl. Every bed-room is open at least on two sides, one of which is necessarily on the west, ensuring plenty of breeze. The store-room and part of the garage are roofed with corrugated asbestos cement sheets.

The open terrace on the ground floor on the west side, if shaded by an evergreen tree and suitably screened for privacy, would serve as an excellent out-door dining or sitting place.

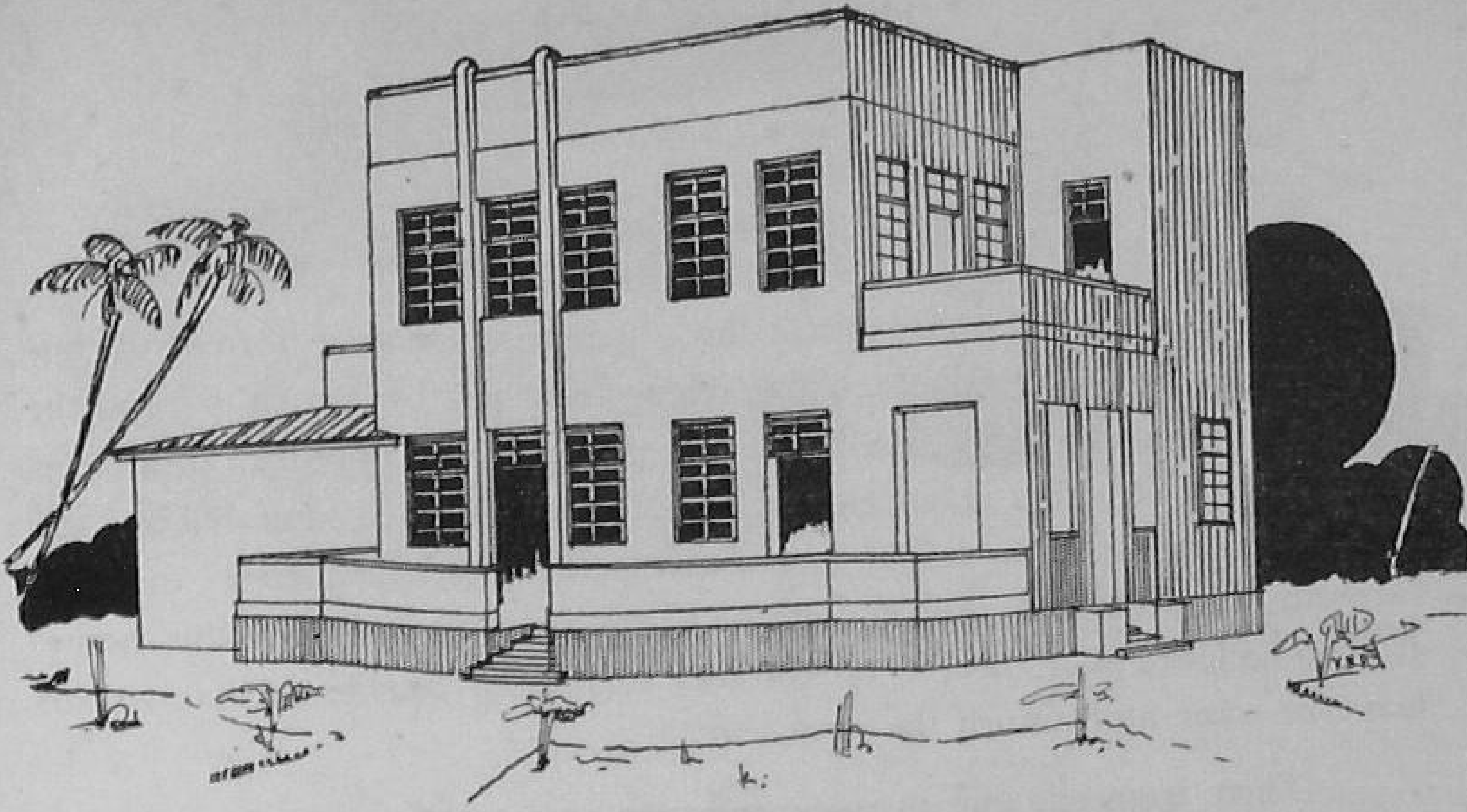


Fig. 168

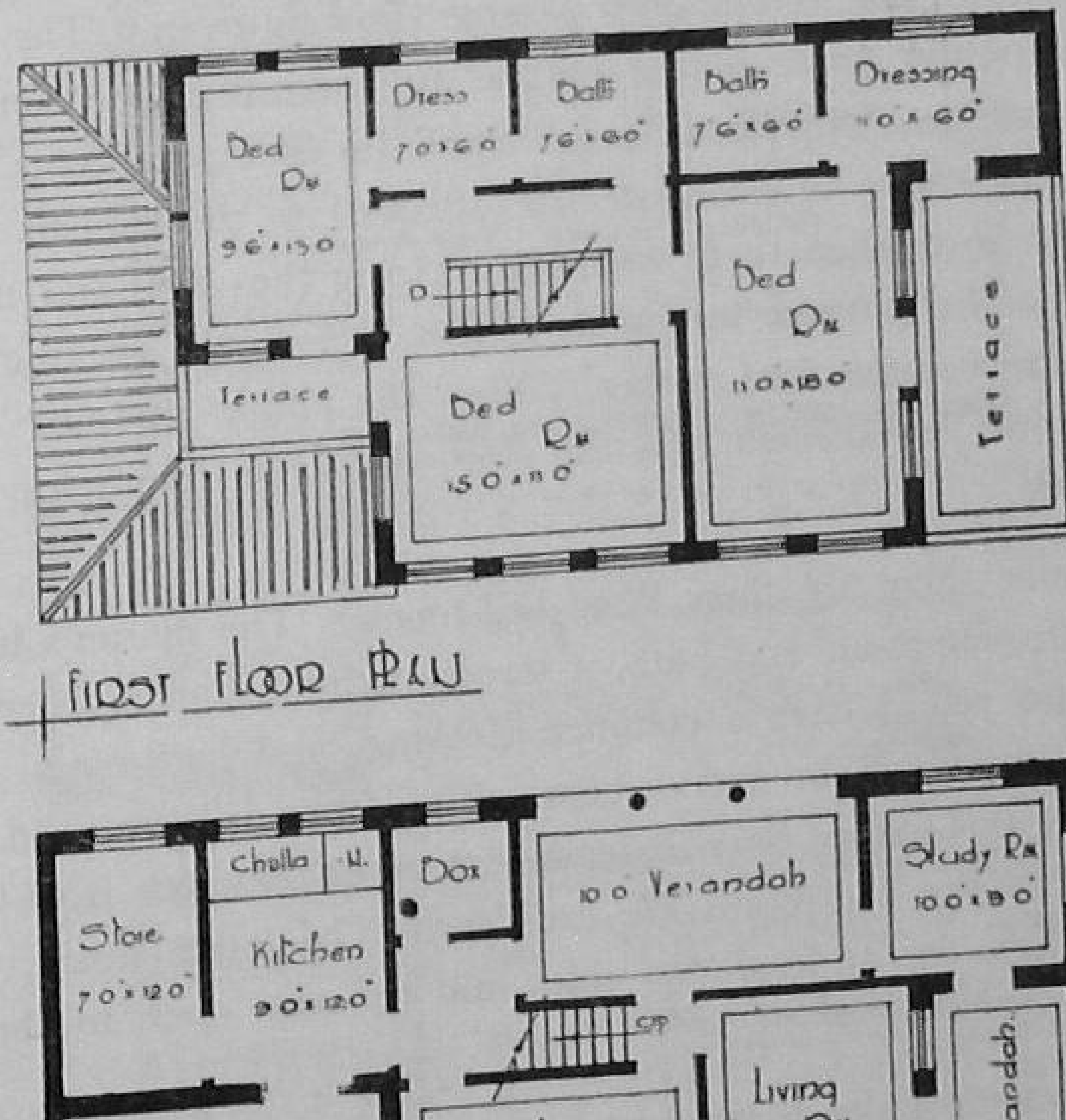


Fig. 169

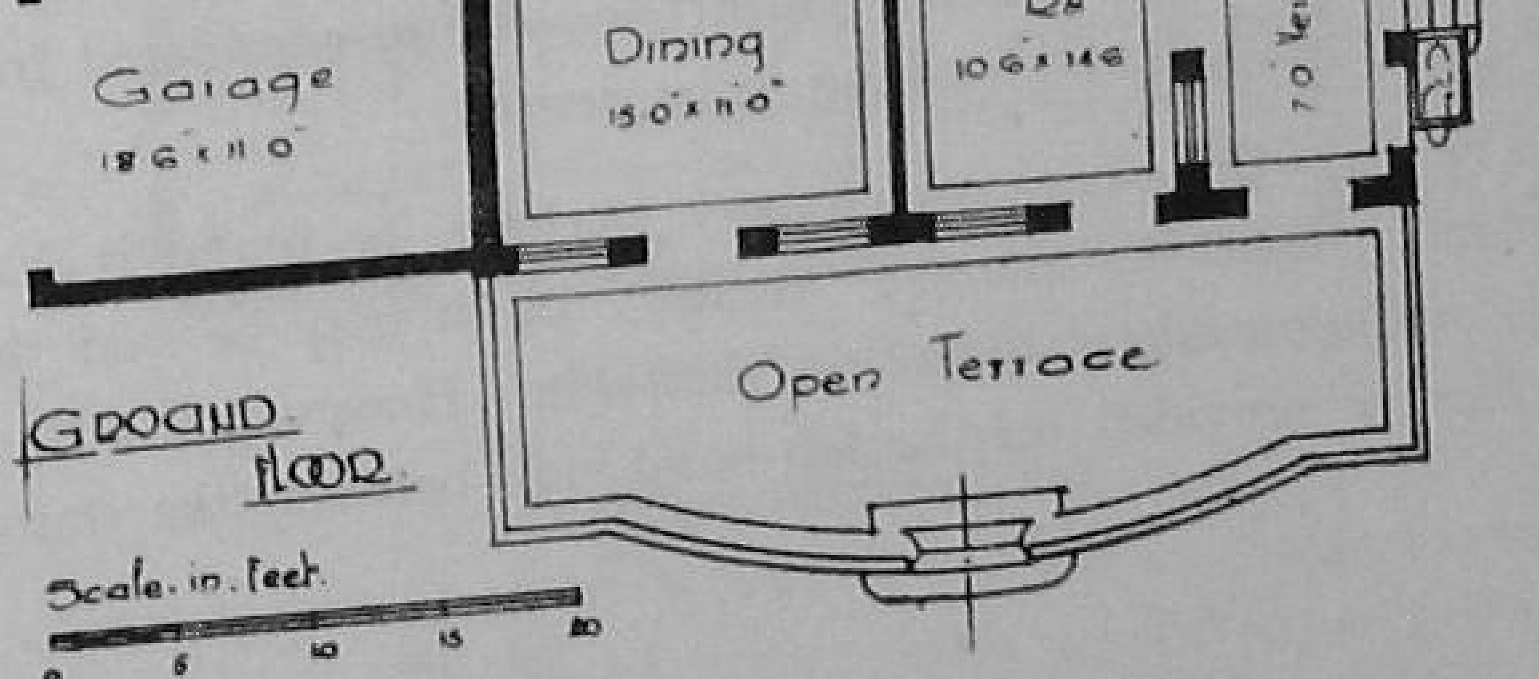


Fig. 170

PLAN NO. 65

Floor Area: 2,365 sq. ft.

Pre-War Cost: Rs. 7,700

No plan can be simpler than this. It is rectangular in form with one room in a corner projecting out. The frontage occupied by it is 52′ 6″ and the depth of the main rectangle is 28′ 6″. This plan is sure to appeal to professors, scientists, men of letters, artists or people who have cultivated some hobby, and such others who take a delight in seclusion and forget themselves in their favourite pursuit. The spacious library is the main attraction of this home. It is so secluded that there is no entrance to it from outside so that visitors may not come and disturb the work.

There is an entrance in a corner to the 10 ft. wide verandah. On the right-hand side of the verandah is a large drawing-room. The kitchen is so big that, ordinarily, there should not be any necessity of a separate dining-room. In that case, the dining-room could be used as a female apartment. There is a store-room of adequate size attached to the kitchen. Behind the drawing-room is another 10 ft. verandah, facing the west, and this is sure to serve a very useful purpose for indoor games, etc., in the evening. The bath-room occupies a convenient corner. Thus the entire grouping of rooms on the ground floor is excellent and the sizes of all the rooms are rather on a luxurious scale.

Upstairs, there are three large bed-rooms. The master's bed-room has a separate dressing-room and bath, a terrace behind, and a balcony in front. The other two rooms have a common dressing- and bath-room. There is a clothes closet provided in every room. The front balcony and the terrace on the top of the library have independent access to them from every room. The sizes of all the bed-rooms are excellent. The latter, again, are exposed to direct sunlight on at least two sides and are also open to the south-west breeze.

The elevation also is very attractive. Thus, considered from any point of view, the cottage leaves nothing to be desired.

The only draw-back which may, perhaps, be found is that there is no back entrance from the kitchen. Against this it may be said that too many openings in the outside walls are not desirable. However, if a family insists on one, it can be provided on the left-hand side between the staircase and the kitchen.

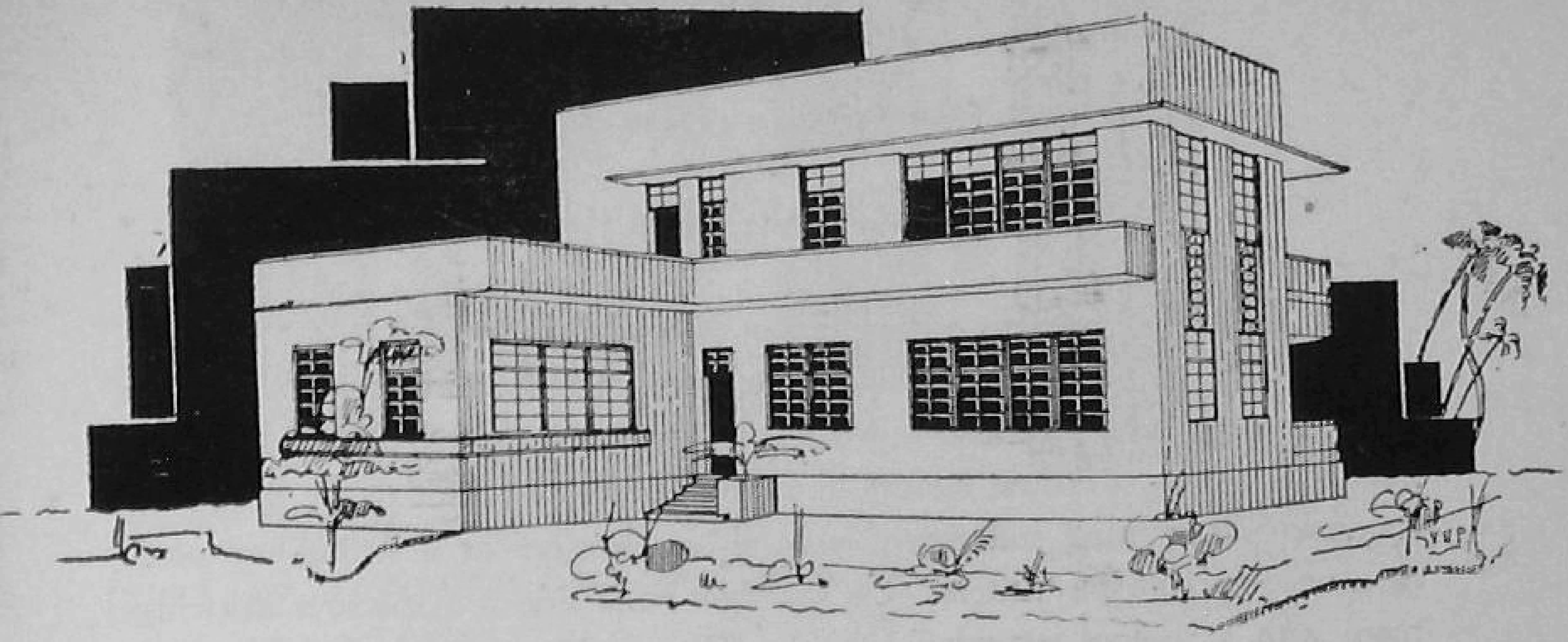


Fig. 171

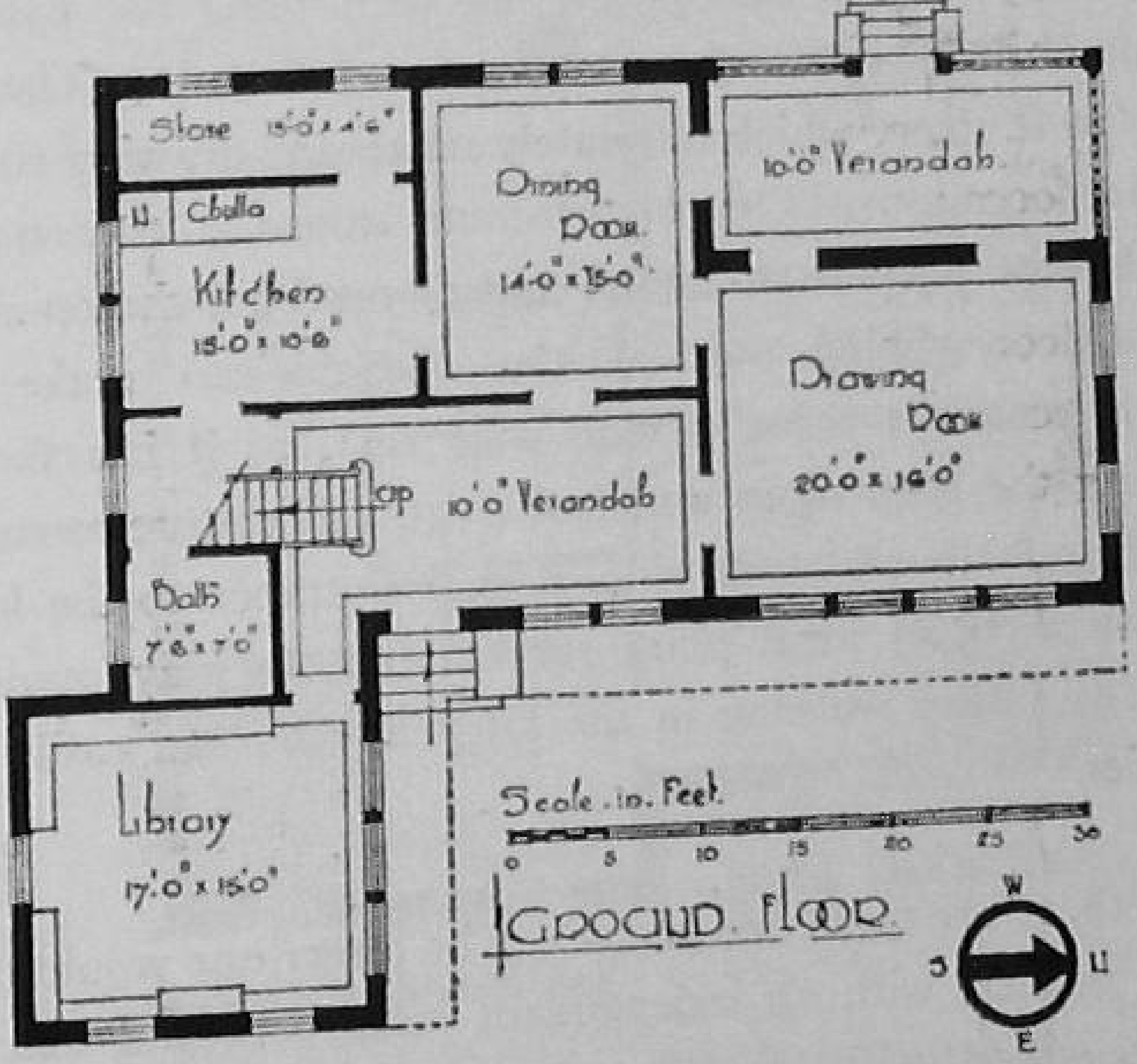


Fig. 172

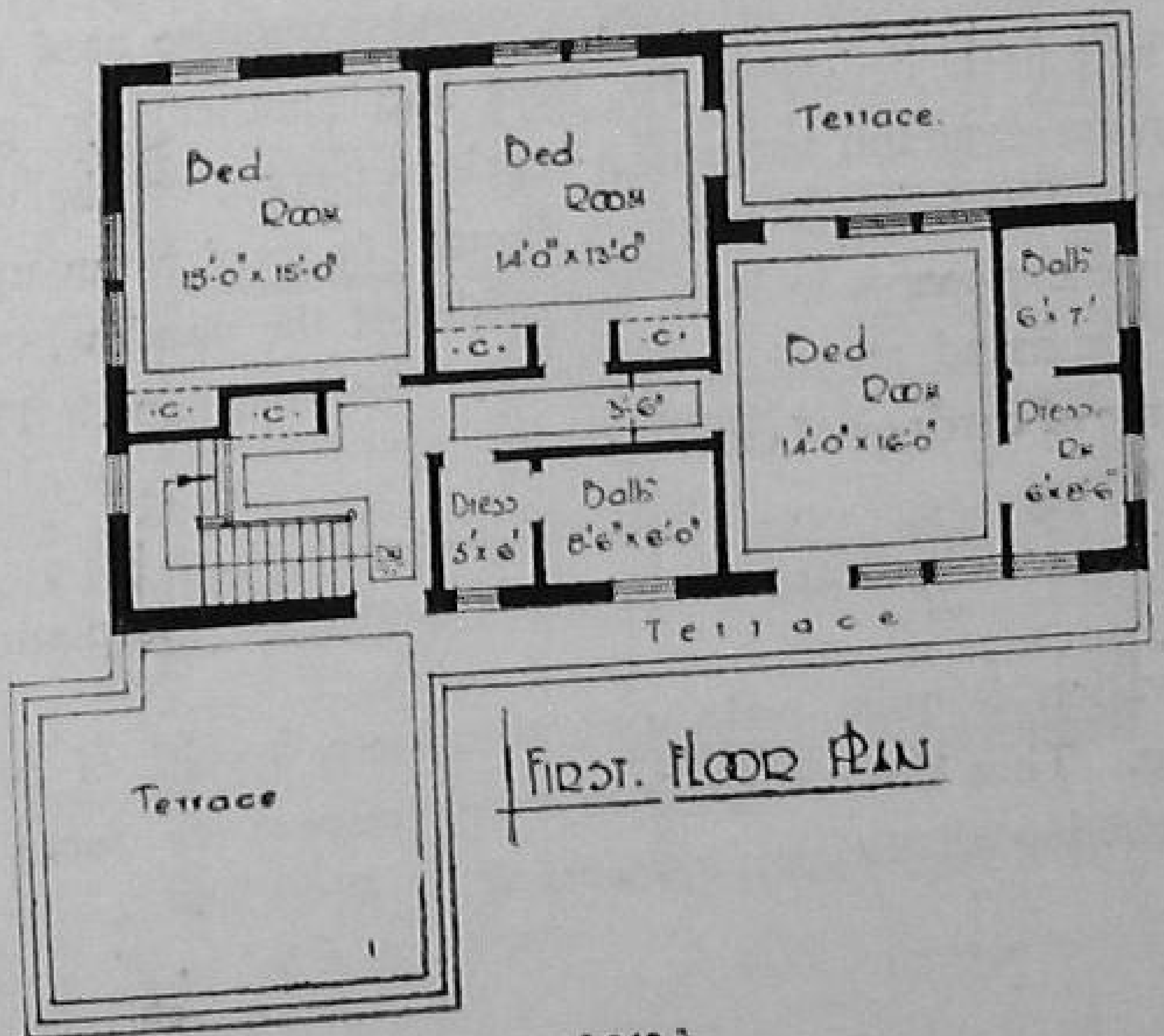


Fig. 173

PLAN NO. 66

Floor Area: 2,417 sq. ft.

Pre-War Cost: Rs. 8,750

THIS is a luxurious cottage on an American model for a small family. At the entrance is a verandah, in which an attractive staircase is placed just opposite to the main entrance. A front staircase, if properly designed, is capable of becoming a central feature in a building. The verandah, or rather the staircase hall, is itself sufficiently large either to serve as a sitting-out place or a waiting-room for visitors. On the right-hand side is a spacious drawing-room with a six-foot verandah behind. The partition between the drawing-room and the verandah can be opened out by folding the panels so that a spacious drawing-hall of 20 ft. square, can be easily made. There is, further, an open terrace 10 ft. deep, which ultimately makes the drawing-room 20′ × 30′, for use on festive occasions. On the left-hand side, the kitchen is sufficiently large to serve also the purpose of dining and, if need be, the open terrace may be used for out-door dining. It is thus possible to make the dining-room serve as a "comfort room" (vide page 60), as it has the further advantage of having the bath-room attached to it. The store-room is very conveniently placed and allows, by its side, a back entrance to the kitchen. The open terrace would be an ideal place for children to play, under the direct supervision of the mother working in the kitchen, who can easily keep an eye on their activities.

Upstairs, there are three bed-rooms. The larger one would be a veritable paradise for the master, with an independent bath-room and spacious balcony on the west side, which, with the help of curtains, can be used as a dressing-room also. There is a bed-room for boys and another for girls, with a large bath-room for common use and a spacious terrace on the west side, also for common use. The lobby is spacious enough to serve as an upper staircase hall and there are cupboards in it on both sides of the window. A seat in the window would command an excellent view of the landscape. The lobby can be used for a game of cards or of carroms.

The positions of beds and teapoys are shown on the plan.

The elevation is quite plain and absolutely devoid of ornamentation yet very enticing. Thus the cottage is in every respect *de facto* one of the ideal homes, satisfying all the requirements.

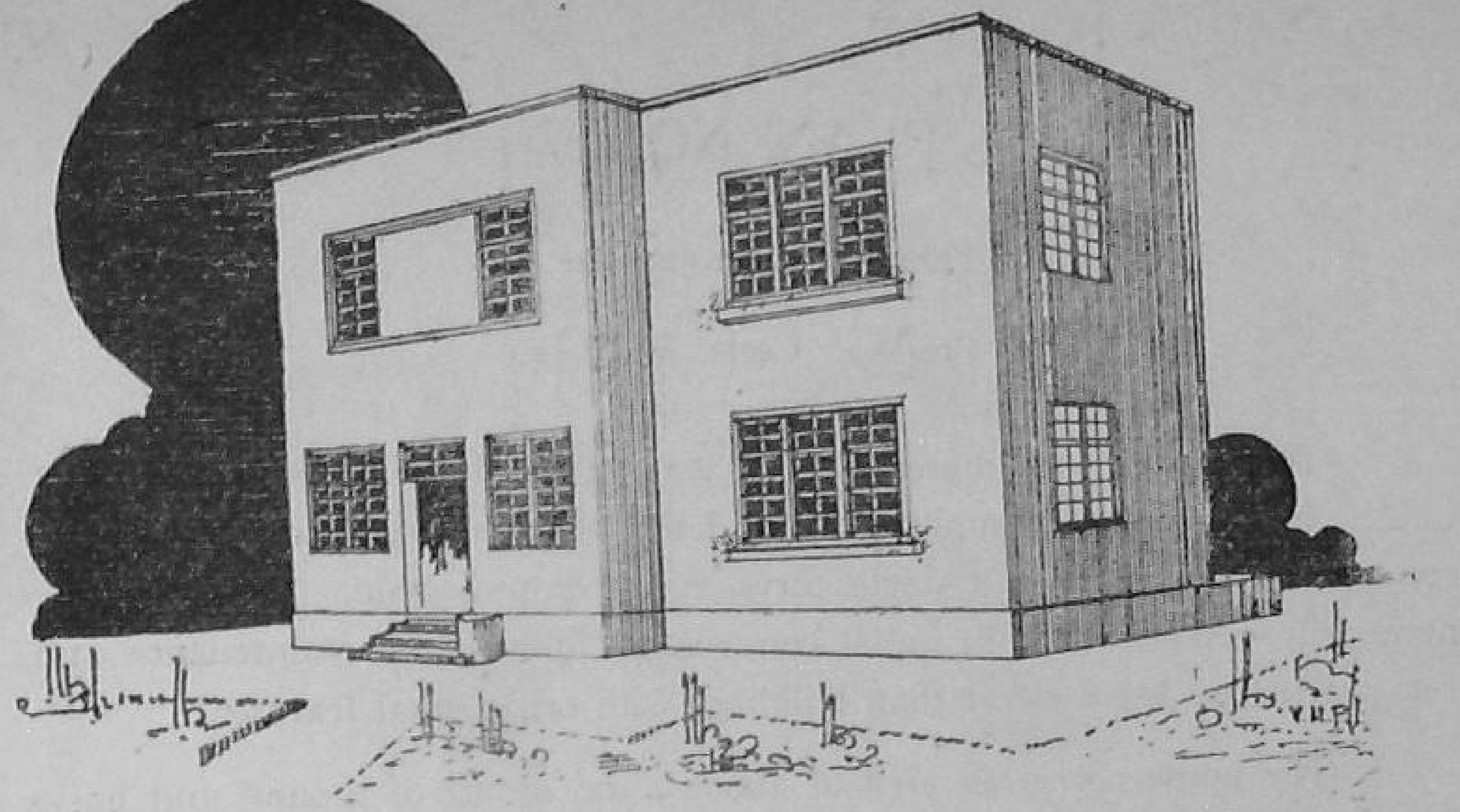


Fig. 174

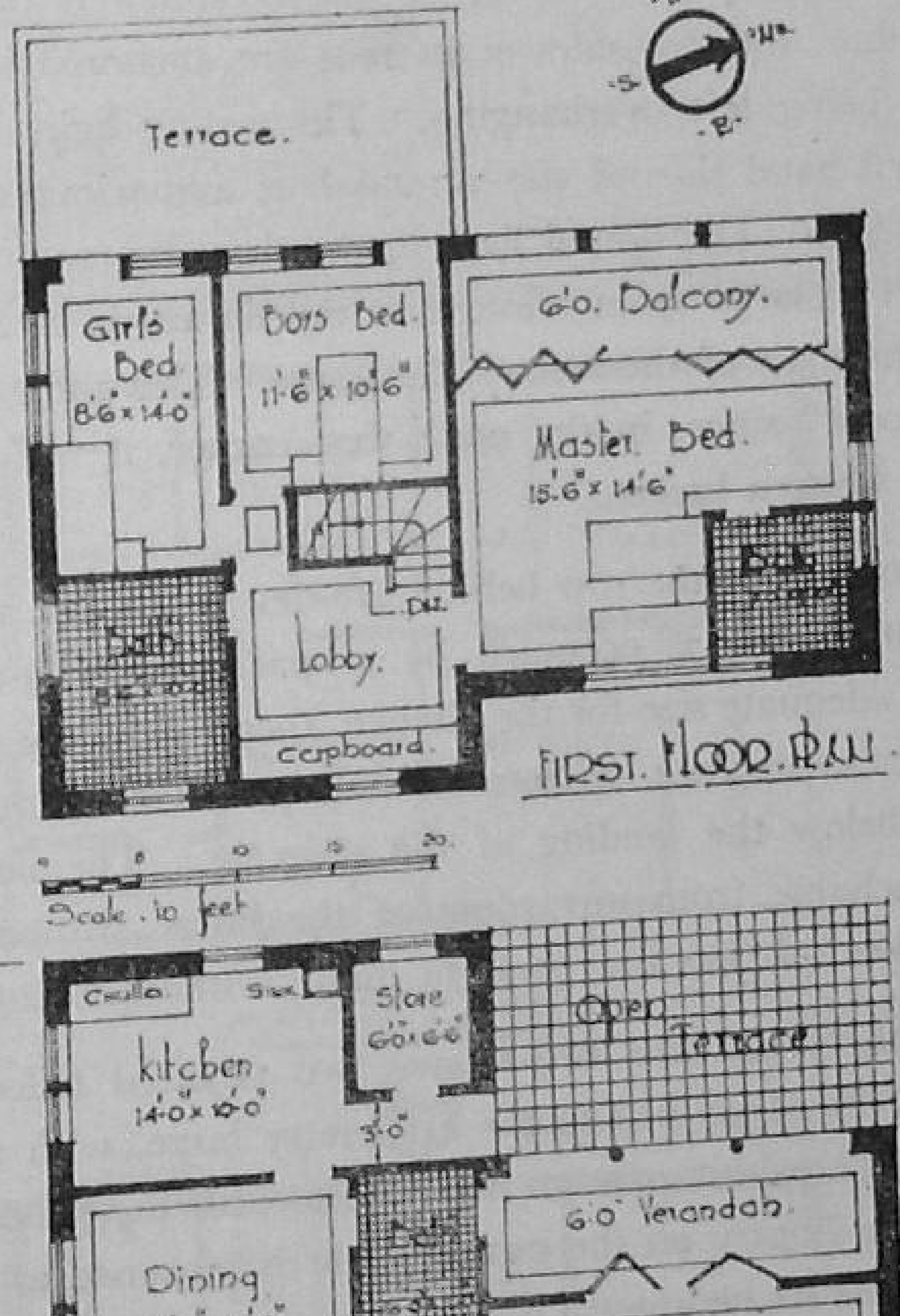


Fig. 175

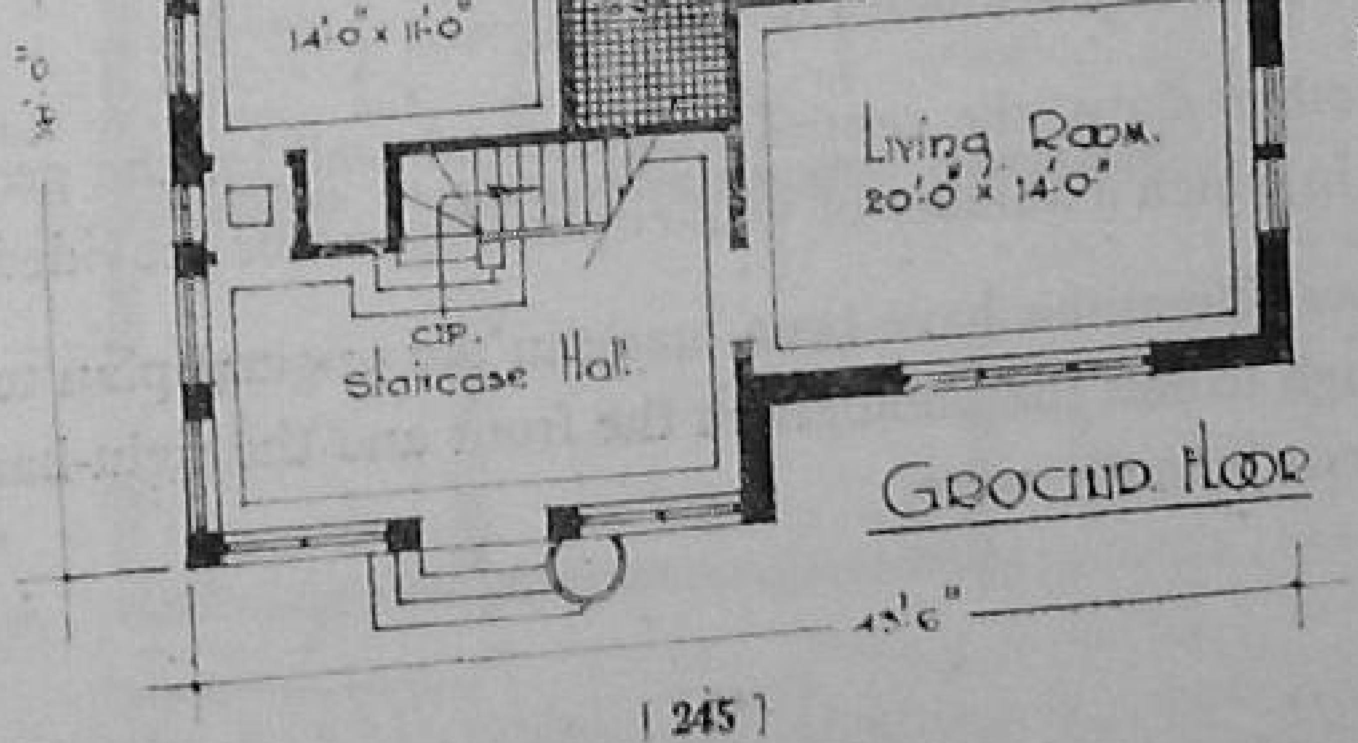


Fig. 176

PLAN NO. 67

Floor Area: 2,520 sq. ft.

Pre-War Cost: Rs. 8,340

THE writer was impressed with this cottage built at Zurich, Switzerland. It is extremely simple both in design and in construction—quite a rectangular plan without a single curve, recess or projection. Such buildings necessarily cost less both in initial construction and annual maintenance and, yet, provide no less comfort than buildings with ornamental features.

The house covers an area of about 1,300 sq. ft. of ground and has a frontage of 44 ft. The main entrance is on the right-hand side into a verandah 8 ft. wide. The special feature of this verandah is that there is not a single post or pillar, the two sides of its roof are anchored into the walls, the other two sides being left overhanging. The ceiling light is in a recess inside. On the left-hand side of the verandah is a spacious drawing-hall with a very wide window. The dotted lines in the drawing-room and library show window seats. The large room allotted to the library is in a secluded corner away from the hubbub of the rest of the house. This room would serve also as a "comfort room" since, in the north-west corner, it will remain cool and also command a western breeze.

The apartments in the row behind are devoted to the service side of the home. The right corner is occupied by a spacious dining-room, next to it comes a room of adequate size for the kitchen, then follow the store-room, bath-room, and the back entrance, all located at the most convenient places. The w. c. is placed below the landing of the staircase. The latter is so placed that it is approachable from any room of the house without disturbing the privacy of the other. It has four straight flights without a single winding step.

Upstairs, there are five bed-rooms, two terraced balconies, one bath-room and one w. c. Two bed-rooms are pretty large, with a common large terrace in front. The short passage midway, secures the privacy of each bed-room. Thus, if the library on the ground floor is reckoned as a bed-room, the small cottage provides six bed-rooms of adequate size.

Unlike other plans, the central longitudinal wall on the ground floor is 15 inches thick in which a number of wall-cupboards can be provided.

Numerous alterations have been made in the original plan to suit Indian conditions, though to suit the photograph the front and the right-hand side have been left as they originally were.

Fig. 177

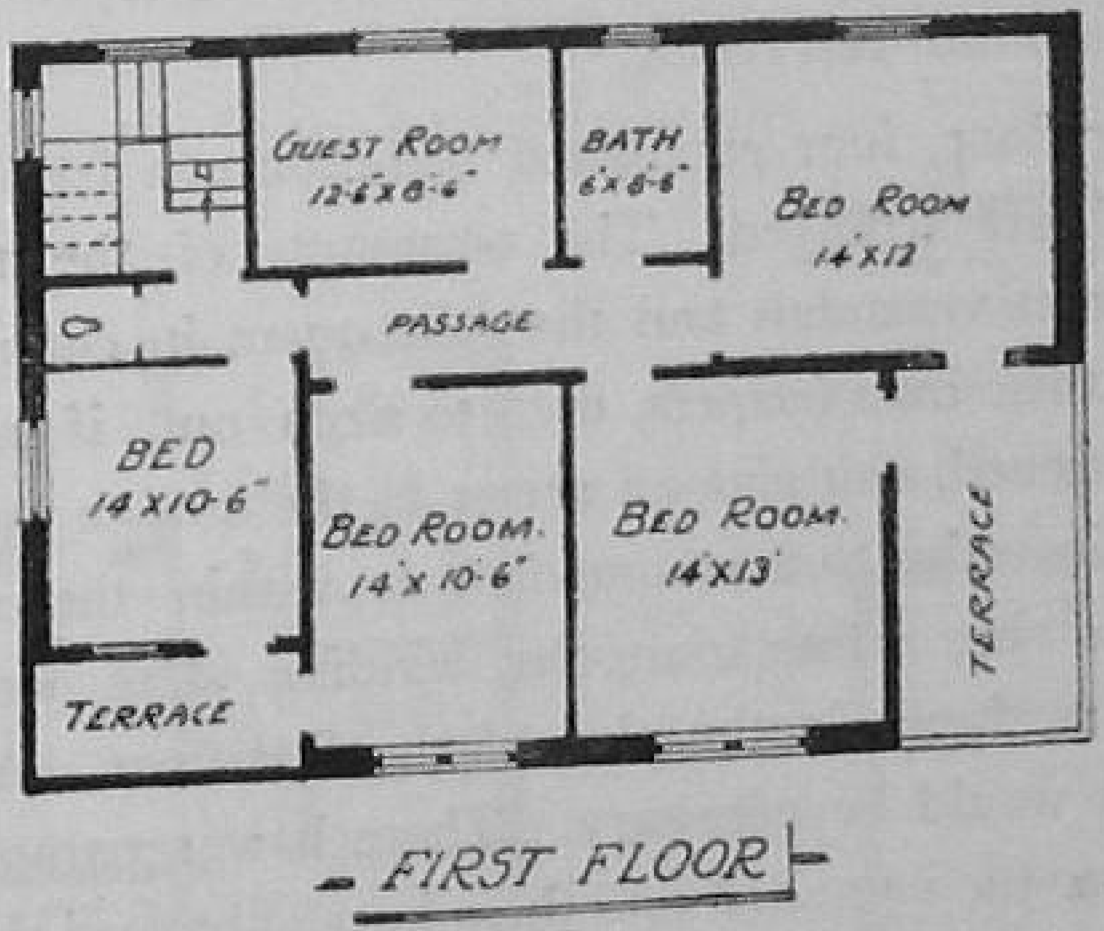


Fig. 178

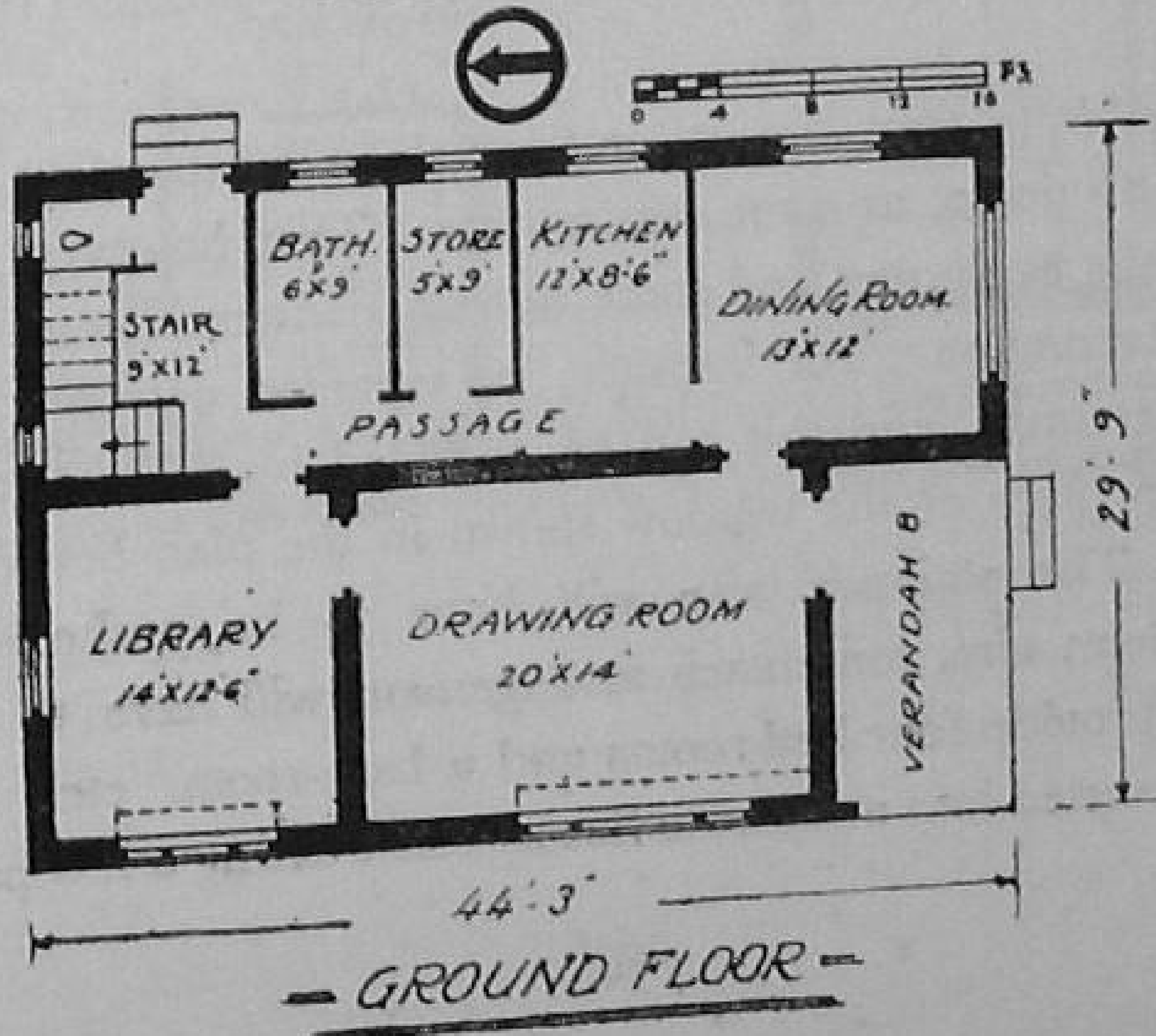


Fig. 179

PLAN NO. 69

Floor Area: 2,677 sq. ft.

Pre-War Cost: Rs. 8,860

The two bay-windows, one in the front bed-room and the other in the dining-room, have added spice to the otherwise quite plain architecture of this cottage. There is a spacious verandah in front, with an entrance on one side of it to allow the whole space on the verandah for use. There is a spacious lobby which may be called even a staircase hall, in front, to preserve the independence of each room. The large front room with a bay-window facing west would be very enjoyable. The staircase has its entrance in a lobby, making it easy of access from any room in the house. The drawing-room is square and not a large one; however, as the partition between it and the dining-room is foldable, both these rooms can be combined any time when occasion demands it. The dining-room, with the semi-circular bay-window facing the west, is oblong and would be of greatest service. The kitchen is close to the dining-room and is of ample size. The store-room also is large and placed at a convenient situation. The bath-room is isolated by a lobby, so that it can be entered directly from any room. There was no necessity of the verandah behind the bath-room, but some washing-place for burnishing utensils, etc., is required for a maid in Indian homes, and as far as possible, it should be away from the kitchen and living-rooms and, therefore, this would be a most convenient place for it. The w. c. has found a very good place below the staircase landing, where it is convenient and inconspicuous. On the upper floor, three bed-rooms, a bath-room and a verandah in front, are arranged, but it is possible to build even five bed-rooms; the fourth on the rear terrace, and the fifth in place of the bath-room, if the latter is extended right up to the dotted line, i.e., upon the top of the washing-place below. The bath-room, in that case, can be pushed back on the top of the 5′ 6″ verandah. The bath-room, required near bed-rooms in Indian homes, is not necessarily for taking a bath, but to be used as a general toilet-room and therefore, a room of even a small size serves the purpose quite well.

The elevation is neat and attractive. The sizes of all the rooms are quite decent for this class of cottage.

A side-entrance near the staircase is specially provided to meet the contingency of treating the upper floor as an independent flat, if and when required.

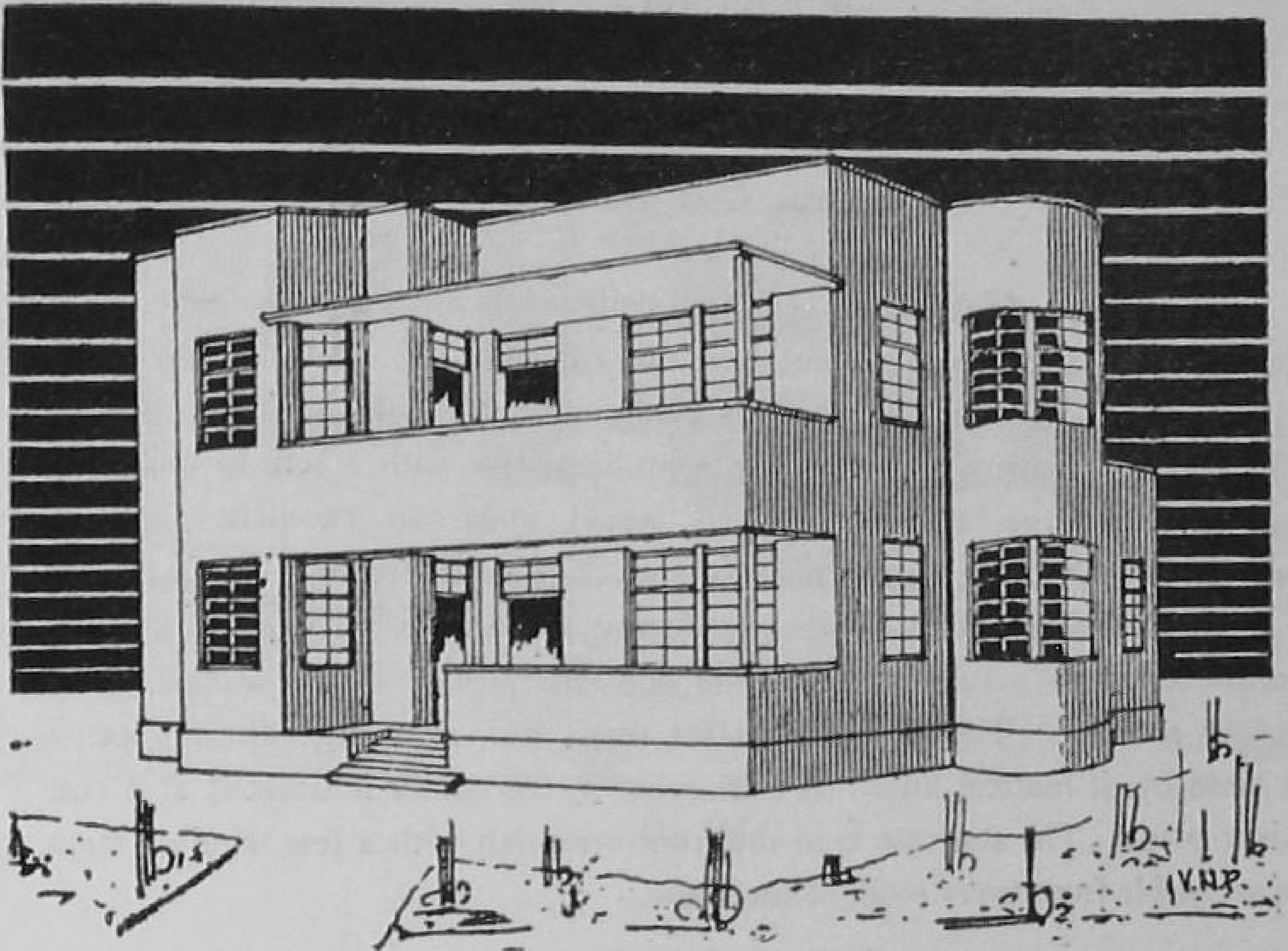


Fig. 183

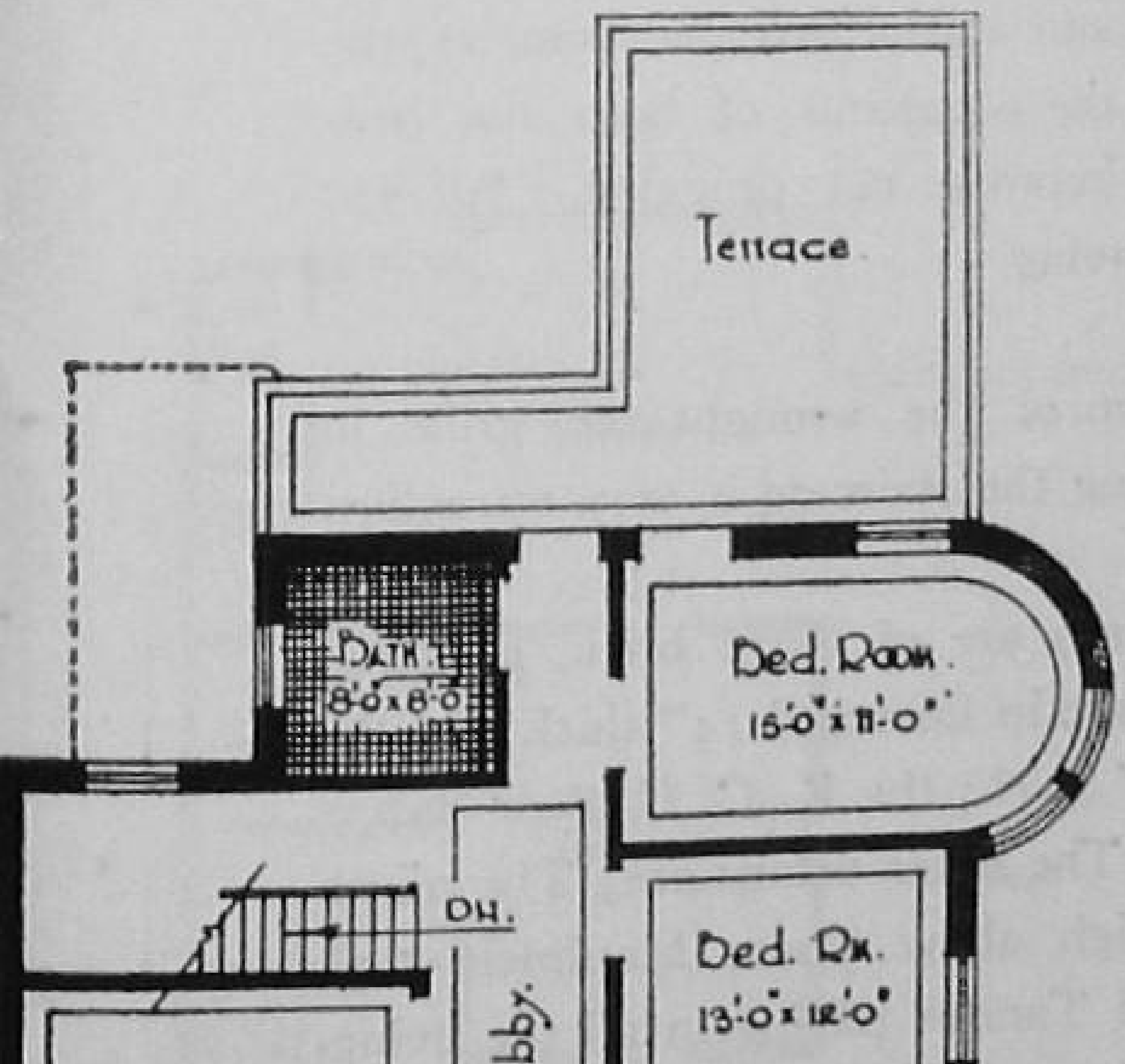


Fig. 184

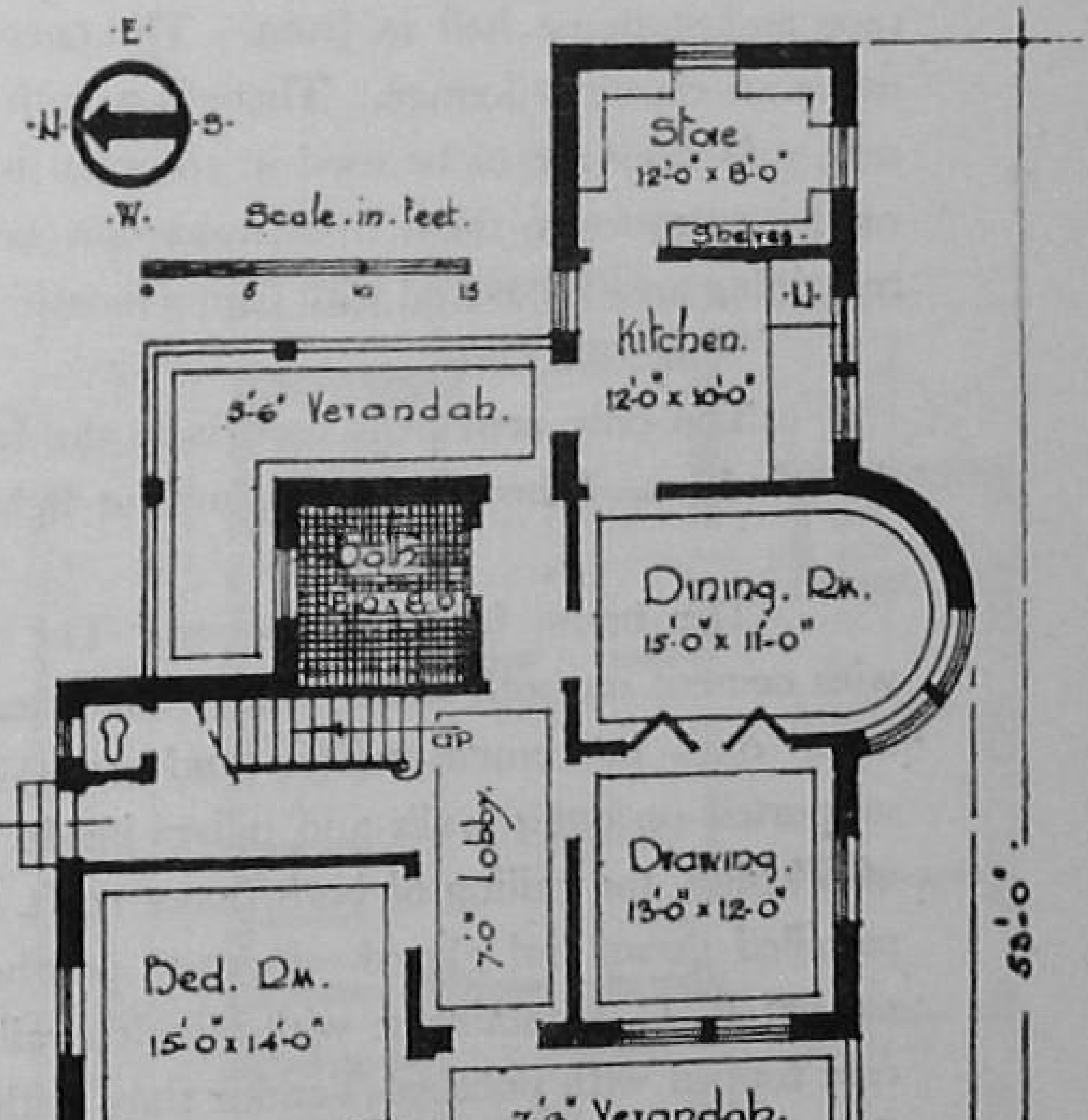


Fig. 185

PLAN NO. 70

Floor Area : 2,663 sq. ft.

Pre-War Cost: Rs. 9,200

THIS plan represents a very well-designed home actually built. The built-up area is nearly square and measures 1,855 sq. ft. After ascending a flight of curved steps, one reaches the verandah 6′ 6″ wide in front. There is a spacious drawing-room on the right-hand side with a semi-circular bay window. The large bed-room beyond would make an excellent "comfort room" with the private bath attached to it. The ladies' room is in the centre, the dining-room beyond it—both very roomy apartments. There are a w. c., a toilet-room and a bath-room on one side separated from the central apartment by a lobby. The kitchen is rather small, but, as a large dining-room is just close by, it matters little. A store-room in the corner is situated at a convenient place. The staircase is in the front verandah with a few winding steps. It is accessible from every room of the house.

On the upper floor, only two bed-rooms are provided with a covered terrace and staircase hall in front. The covered terrace or the verandah would make an excellent lounge. There is a bath-room and a dressing-room at the rear. As they are to be used in common by the occupants of both the bed-rooms, entrance to them from inside any bed-room is not provided. All the remaining area is covered with China mosaic paving.

The only ornament used is in the form of the wrought-iron grille in the windows. The corner window for lighting the staircase is very attractive.

The house faces north-west. The walls are of burnt brick, plastered with cement on both sides. The outer ones are in lime and 14″ thick and the inner ones in cement-mortar and are 4½″ thick; the R. C. C. floor slab is supported on outer walls and pillars inside. The other details are: The plinth 2′ 6″ high, the ceiling of both floors 10 ft. high above floor; Moulmein teak panelled doors and glazed windows; polished Tandur paving in all the living-rooms; R. C. C. staircase with wooden railing and balustrade; steps of staircase topped with polished Tandur slabs with rounded edges. Door and window fixtures of rustless steel; concealed electric wiring. The outside is kept cement-grey.

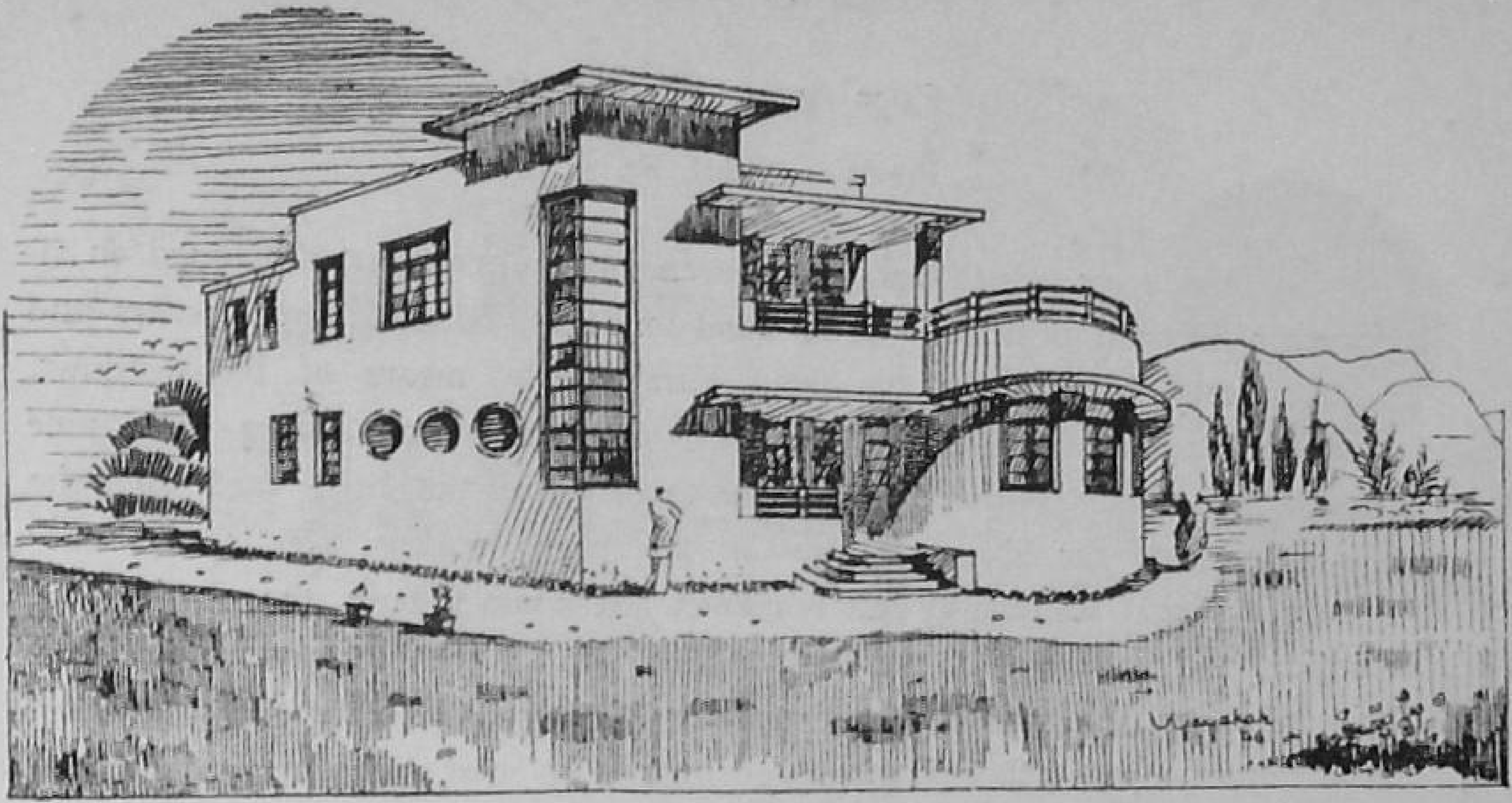


Fig. 186

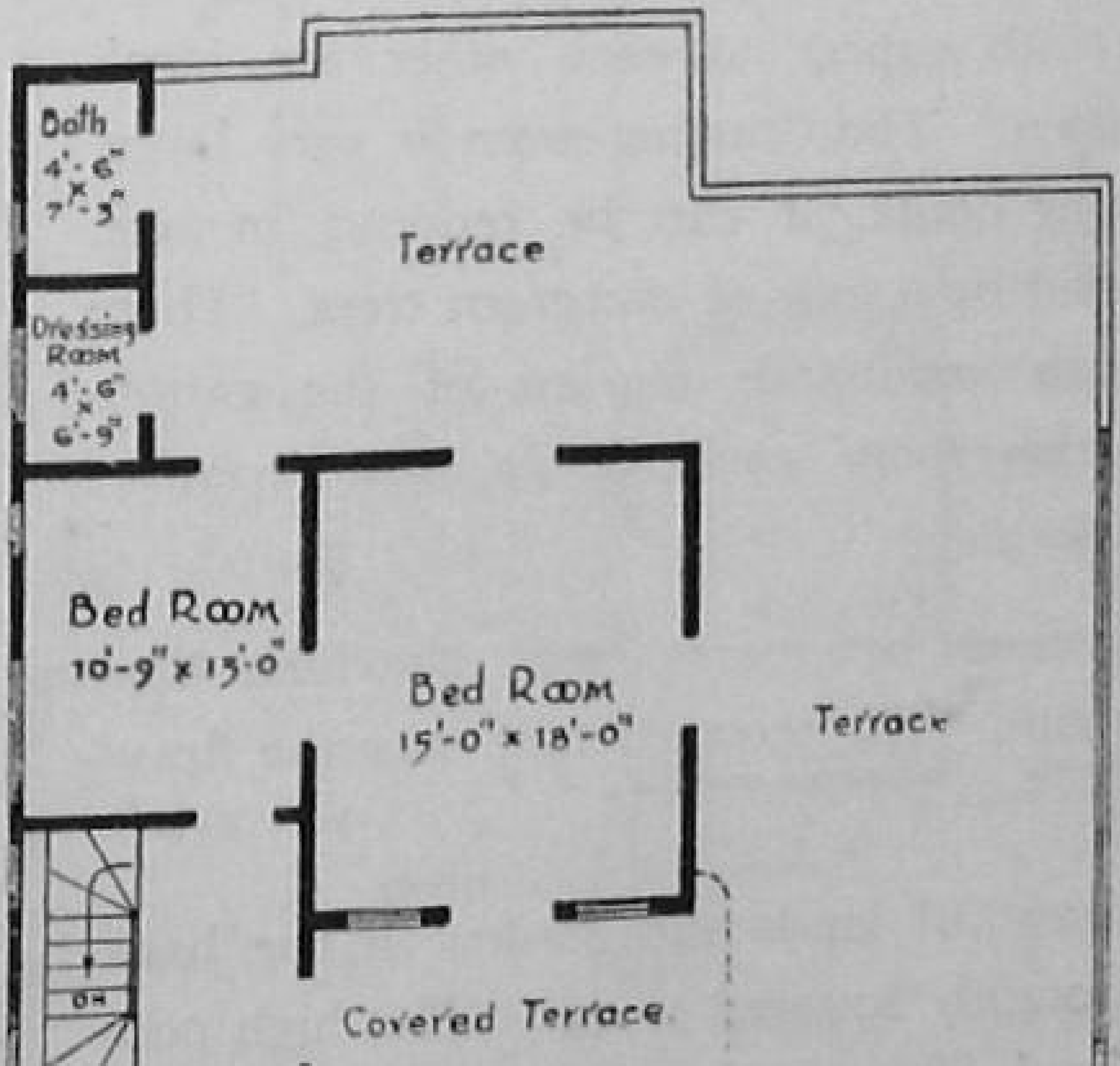


Fig. 187

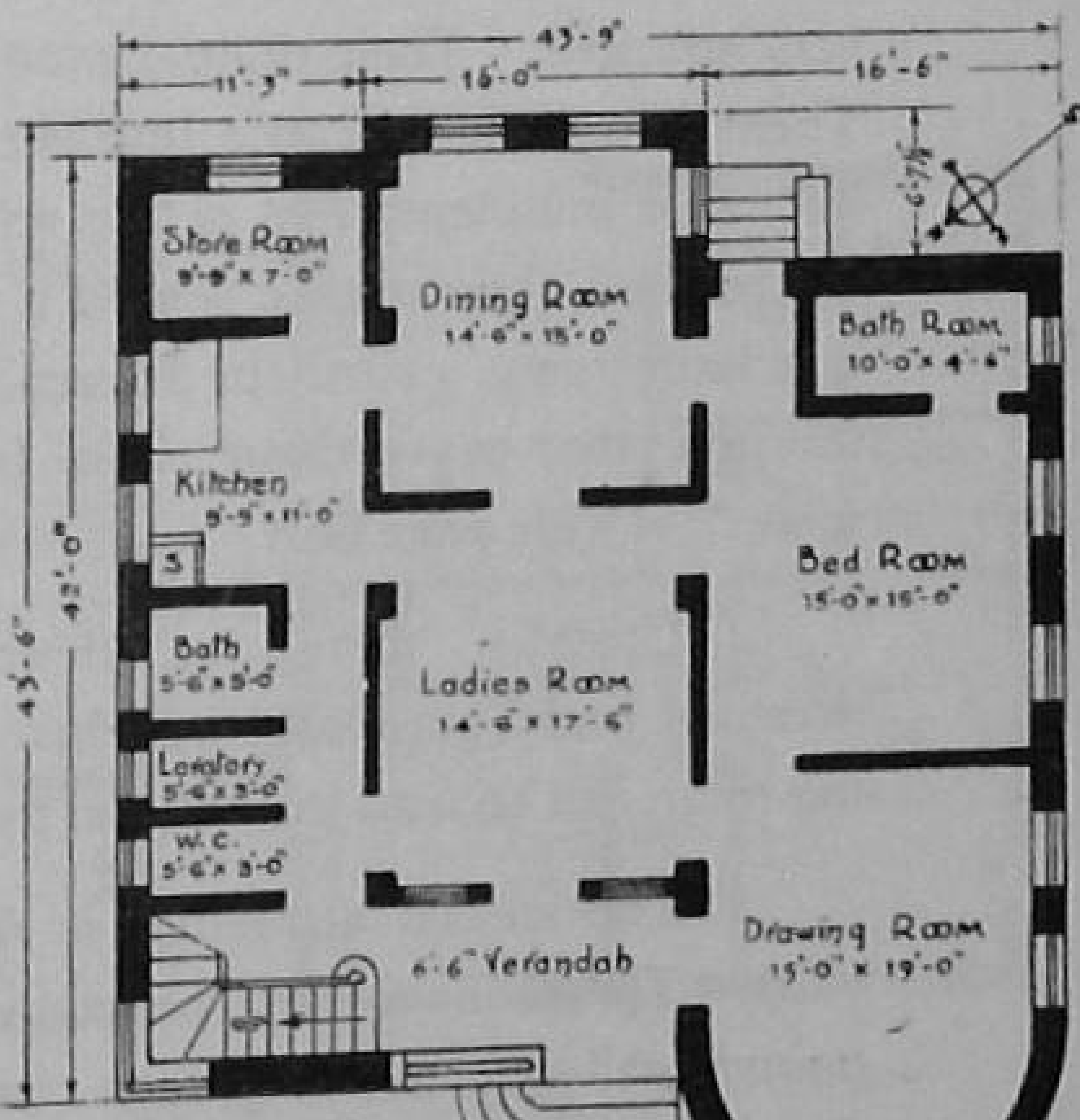


Fig. 188

PLAN NO. 71

Floor Area: 2,830 sq. ft.

Pre-War Cost: Rs. 9,325

This home, which embodies convenience and comfort, is planned on altogether different principles. The usual tendency, both of house-owners and of architects, is to make the front attractive by means of bay-windows, porches, etc., and to further beautify it by giving it a good setting of a nice landscape garden. But in this plan the garden is in the back yard and the bay-window of the library is also at the back looking over the beauty of the garden. Rationally, this is correct. A house is built for the health, comfort and happiness of the inmates and not for the pleasure of outsiders. If you, therefore, embellish the front part of your house, it is only for show. You cannot enjoy it, though the passers-by may do so at your expense. On this principle, the modern trend is to plan the main landscape garden in the back-yard for out-door living, where privacy and safety for children are assured and thus the family can enjoy themselves better. (Vide page 74.)

In this plan, the drawing-room is placed in the extended part of the main house isolated from it. In this position, the size of the drawing-room does not affect the main building. The latter is 31′ 6″ in front and 41′ in depth. At the entrance is a verandah 15′ 6″ deep, in which is featured an attractive staircase. All the rooms, including the kitchen, bath and store, are very spacious. Their mutual positions with respect to each other are ideal. There is a back entrance into the garden. The drawing-room is very large, but, as it is independent of the remaining house, it can be reduced in size. There is an open terrace behind it, shaded by a pair of evergreen trees. There is a large room, called the library, which commands a view of the garden through the bay-window. In fact, this room would be an ideal "comfort room." (Vide page 60.)

Upstairs, there are three spacious bed-rooms, two of which have dressing- and bath-rooms attached to them. The terraced roof over the drawing-room can be used in common by all.

The special attraction is the beautiful landscape garden in the back-yard. The pathways are paved with roughly squared stones. The high compound wall screens the garden and affords it privacy from the neighbours. There is a pool in a corner with a seat in front. Another seat is made near the vegetable garden.

The orientation is not indicated on the plan. Still, east-facing would be very appropriate. Next best is south.

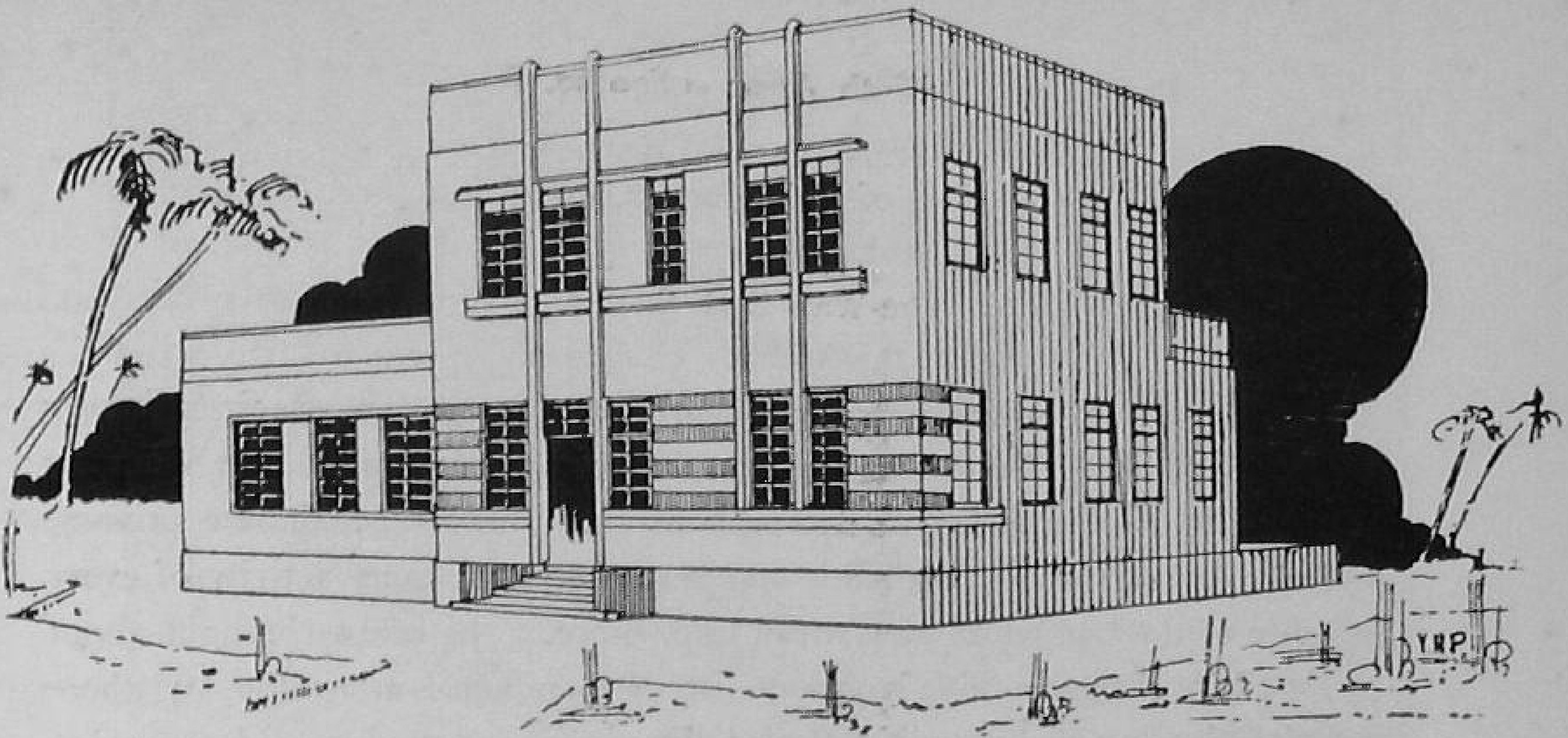


Fig. 189

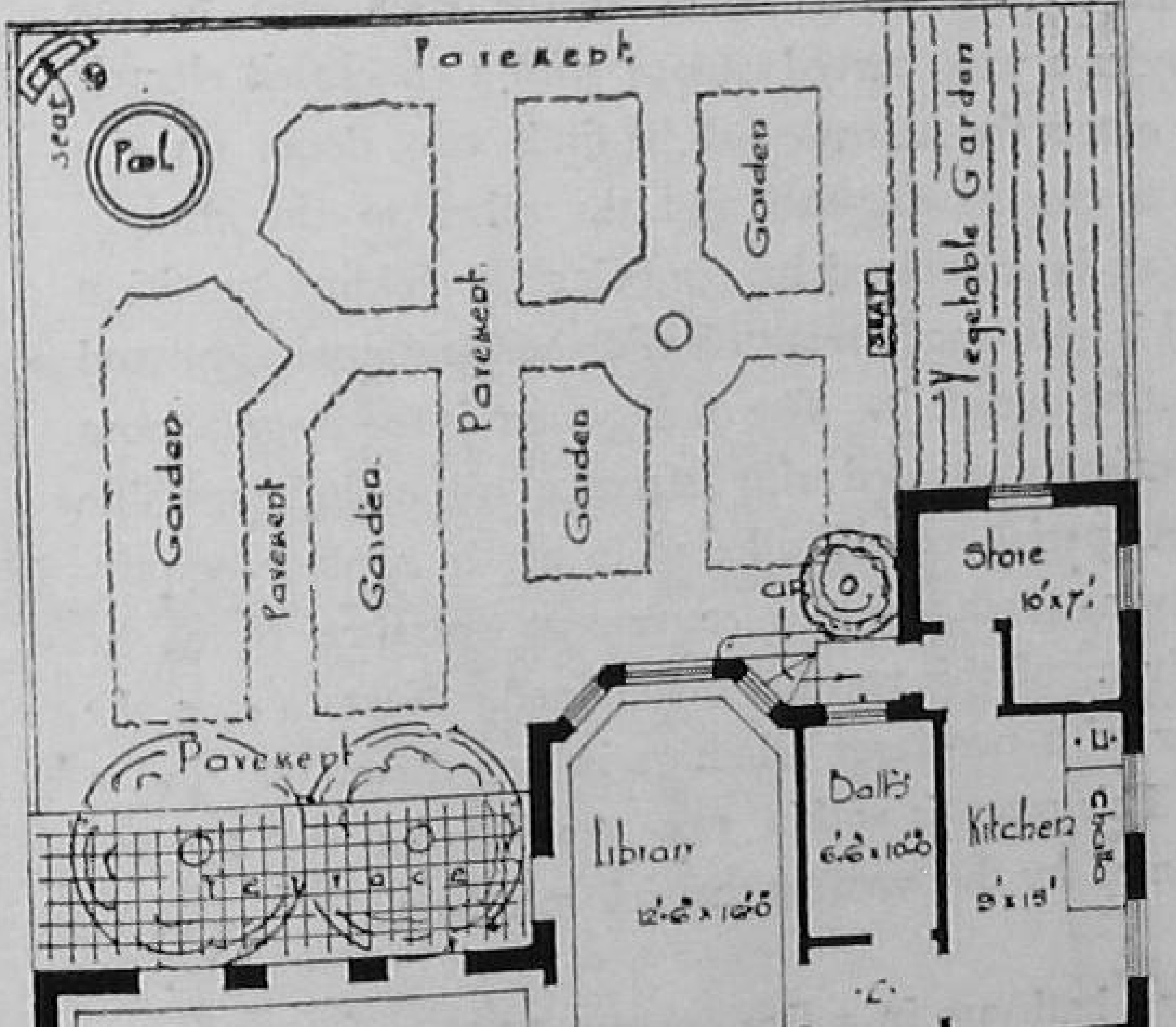


Fig. 190

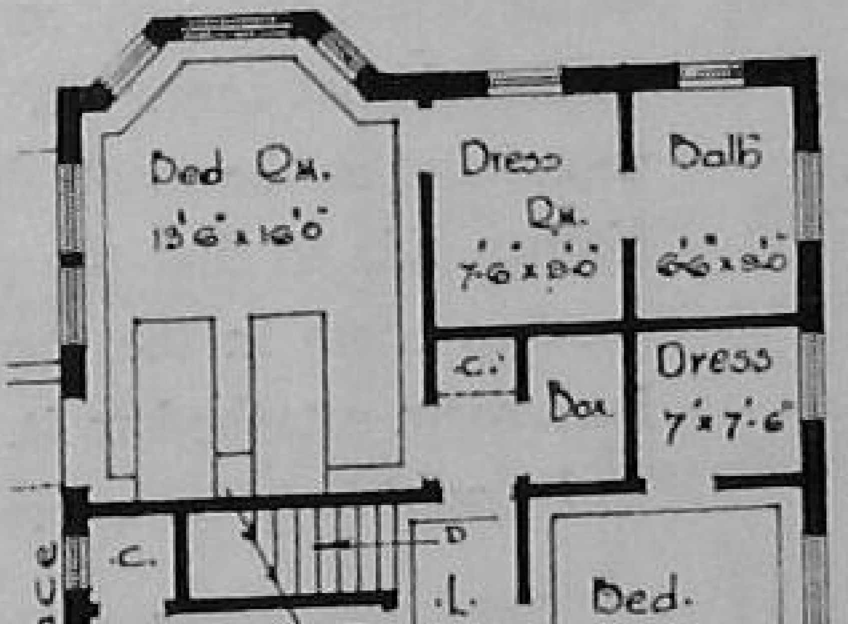


Fig. 191

PLAN NO. 72

Plinth Area: 1,690 sq. ft.

Area of both floors: 2,840 sq. ft.

Pre-War Cost Rs. 22,500

THIS is an economically and compactly planned but spacious luxury home for a family of upper middle class, in which there are all the elements which go to make a home the real pride of the family. Maximum privacy, free circulation, the best flexibility, and ample room for every activity of every member of the family are everywhere in evidence. The beauty brought about by simplicity of mere outline is obvious. In the elevation shown in Fig. 192 there is a nice blending of the traditional tiled hipped roof and modern wide sweeping curves of the *Chhajahs* and plane surfaces without ornamentation.

The curved steps with concrete flower boxes at the ends lead to the vestibule at the entrance under a wide curved canopy with a concealed electric light in its ceiling. As one enters the staircase hall he finds two doors on the left-hand side: one leading to the drawing-hall and the other to the dining-room. Both these rooms can be combined by removing the folding partition between. The drawing-hall is quite modern with a wide horizontal window and a concrete flower box projecting outside it. The dining-room is the largest room in the house and very conveniently situated with reference to the kitchen. The woman is not forgotten. A special room is allotted to her in a place equally prominent as the men's drawing-room, with a convenient entrance from the kitchen side so that the privacy of this room is maintained. Next to it is the comfort room in the corner with two large windows in two directions, and a bath-room attached to it. This room is within easy reach from the kitchen and would be most appreciated by the aged or the sick members.

The store, pantry and bath are in a line separated by a passage. The kitchen is of adequate size and has two windows and a spacious verandah in front. Behind the drawing-room is a small room which may be an ideal room for study or office with an entrance to it from the back.

The bed-rooms upstairs which are large and have separate bath-rooms to each are so arranged that each can be independently approached through a small lobby. If a door is provided behind the staircase instead of the closet shown, the terrace could be entered from the bed-room on the right-hand side.

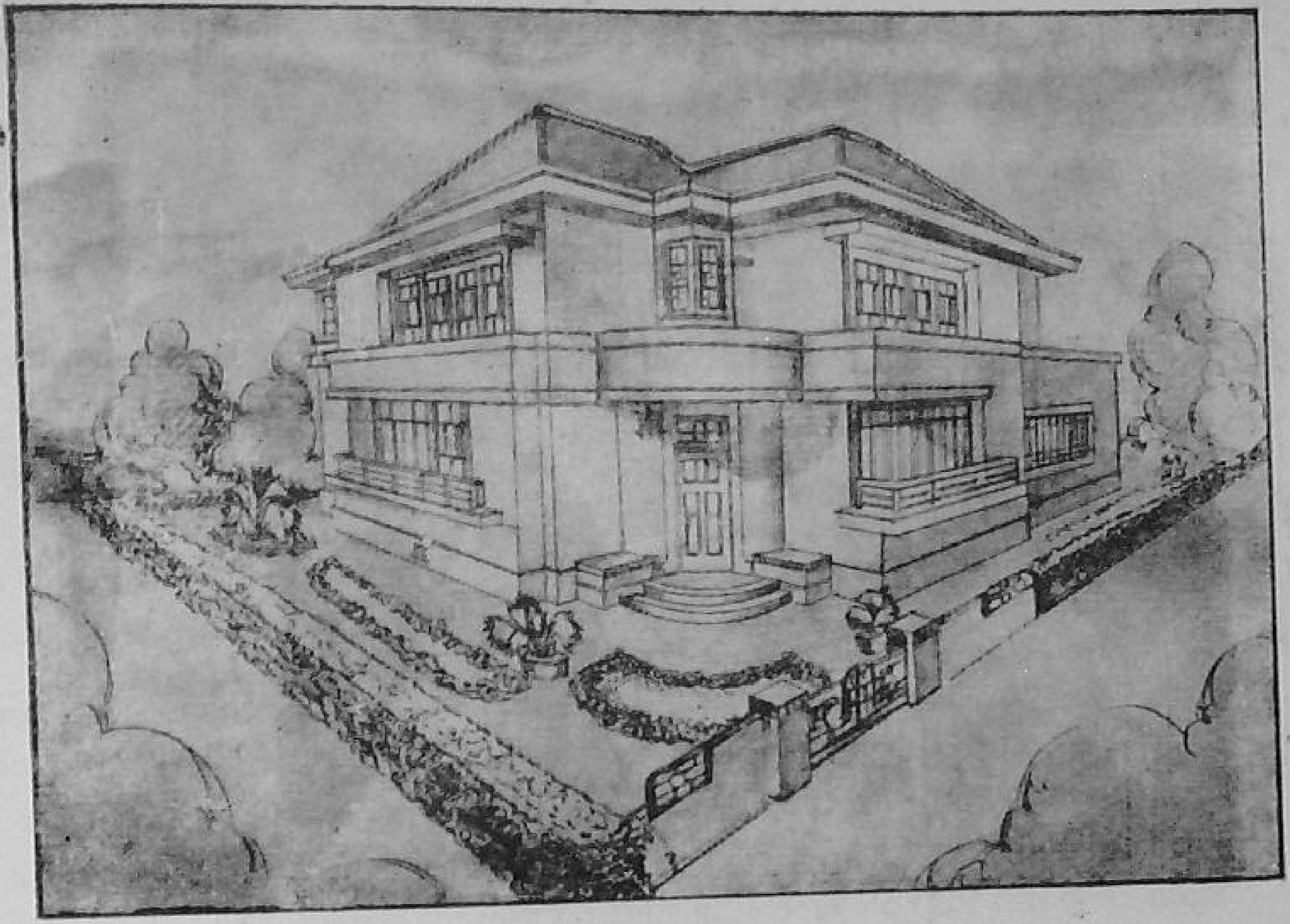


Fig. 192

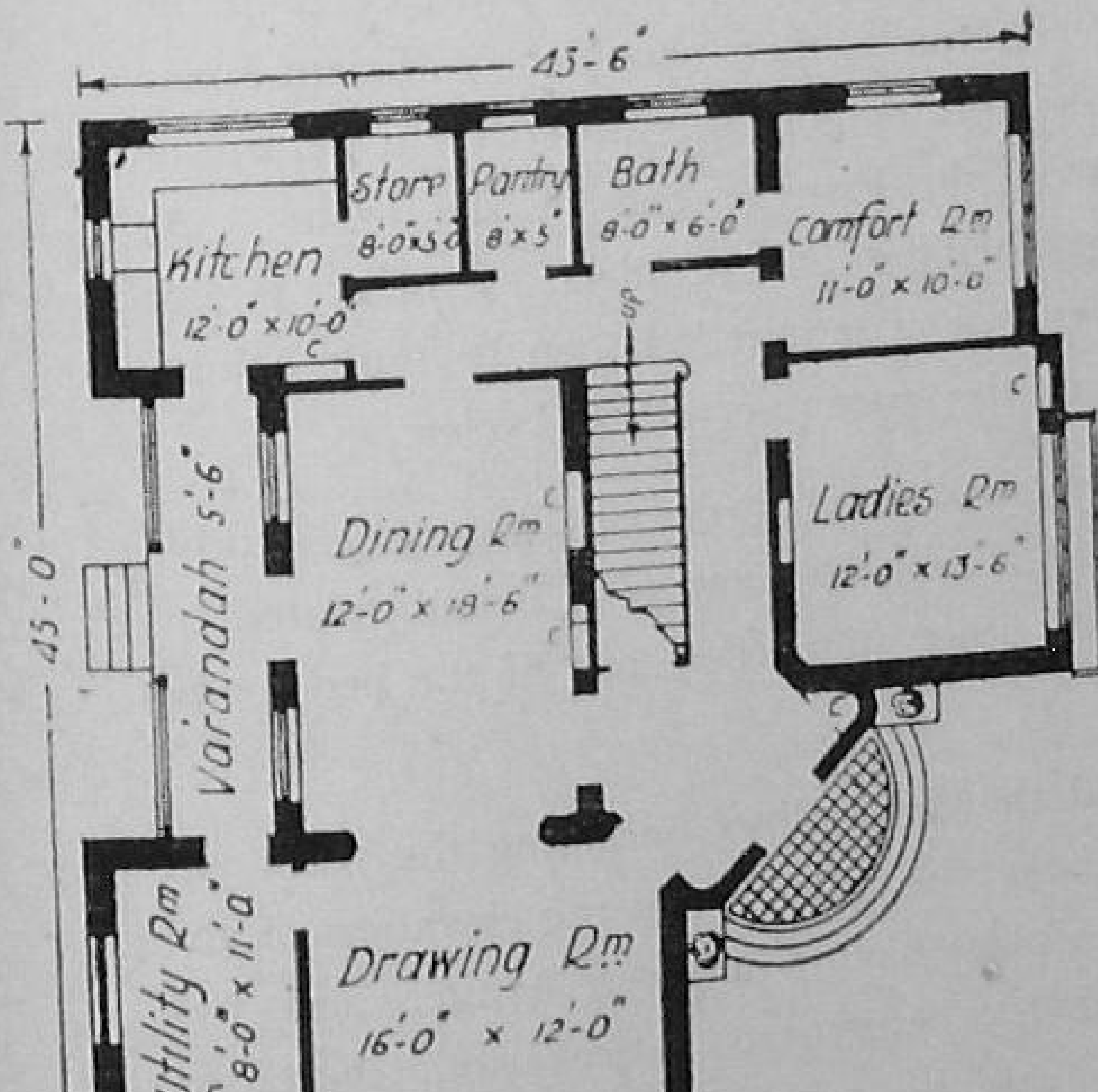


Fig. 193

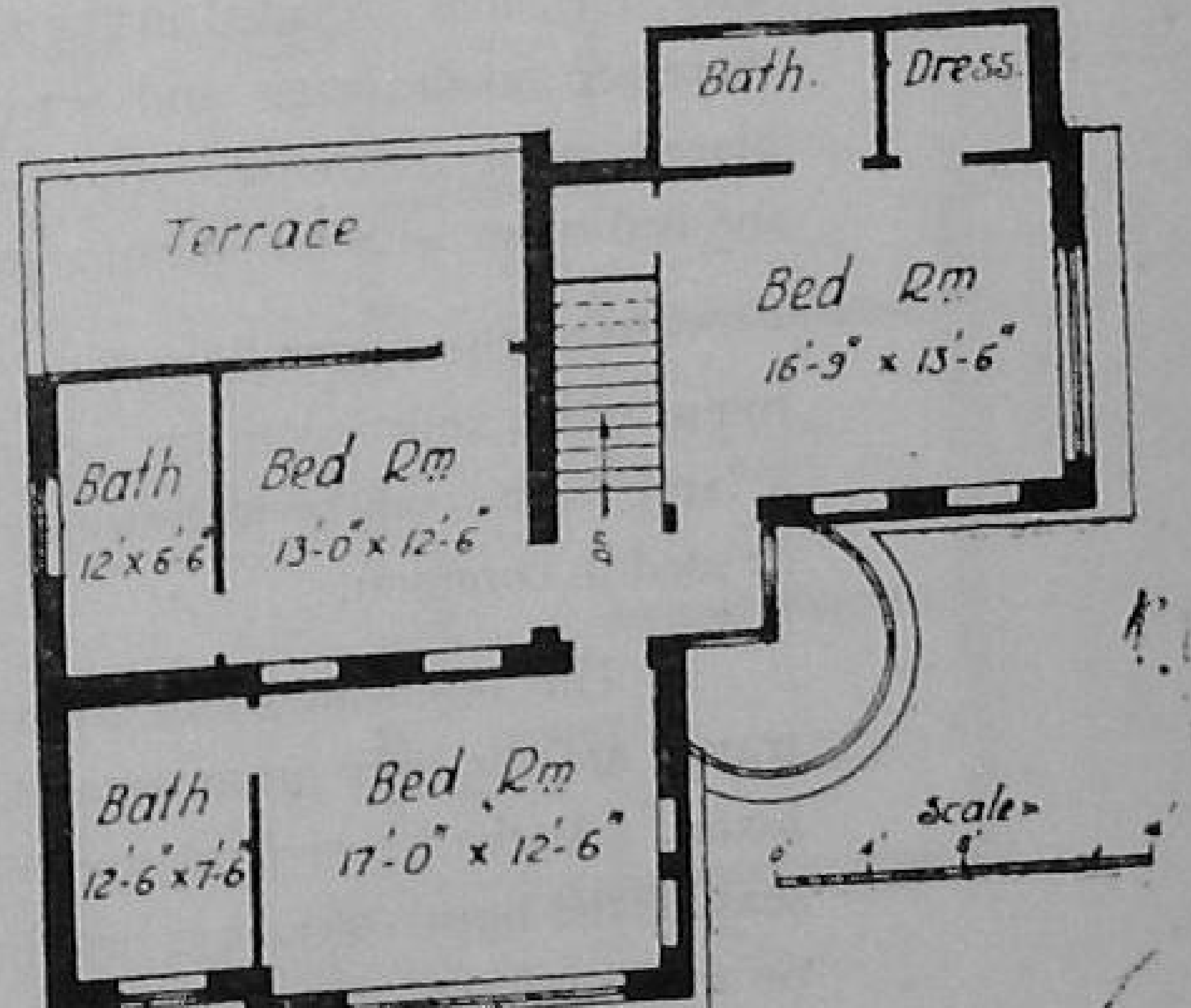


Fig. 194

H. F.—17

PLAN NO. 73

Floor Area: 2,848 sq. ft.

Pre-War Cost: Rs. 9,400

THE plan of this home was designed for the special requirements of a family living at a place where protection from high winds and piercing rain was required, rather than from heat. That is why no verandah is provided either on the ground or on the upper floor. The sizes of rooms are rather on the side of luxury than economy. It is designed for a south-facing; however, with slight alterations it can be made to suit a northern aspect also.

There are in front a small dining-room on the right-hand side and a large drawing-room opposite to it, separated by a spacious lobby 7′ 6″ wide. The excellent sized bed-room behind the drawing-room, would serve as a very good "comfort room," as it is close to the kitchen and bath and would remain cool and full of breeze in the north-west corner. The kitchen is a spacious oblong room, and as such, very useful. There is a side entrance behind the kitchen in a lobby. The latter makes the bath-room easily accessible from every room in the house. The store-room is quite conveniently placed with respect to the kitchen, and is a fairly large room. The staircase is in the front lobby and has only one flight. Normally, there should be sufficient space for cycles available below the staircase, but, if more is required for a perambulator, etc., it is provided in the nook at the extreme end of the lobby. As there are no drainage and sewerage facilities at the place, a privy is not placed inside the home. If, however, one is required, it can be built behind the bed-room with an entrance through the space reserved for cycles.

On the upper floor, five very good sized bed-rooms, a small study-room and a toilet-room are arranged. The study-room may be substituted by a large bath-room or a dressing-room, either attached to one of the bed-rooms or used in common.

The bay-window in front and the simple lines bordering the front entrance are the only ornamentation, if they be called so, in the elevation of the house. As the house is planned for a place having a severe winter and wet season, the upper terrace is not intended to be used as a deck and, therefore, no means of easy access, such as a staircase, has been provided.

The outer walls are of brick-in-lime, 18 inches thick, cement-plastered on the outside, inner ones are 9 inches thick, since the site is cheap and ample and bricks, locally made, are very cheap.

The area covered by the building is roughly 39 ft. square.

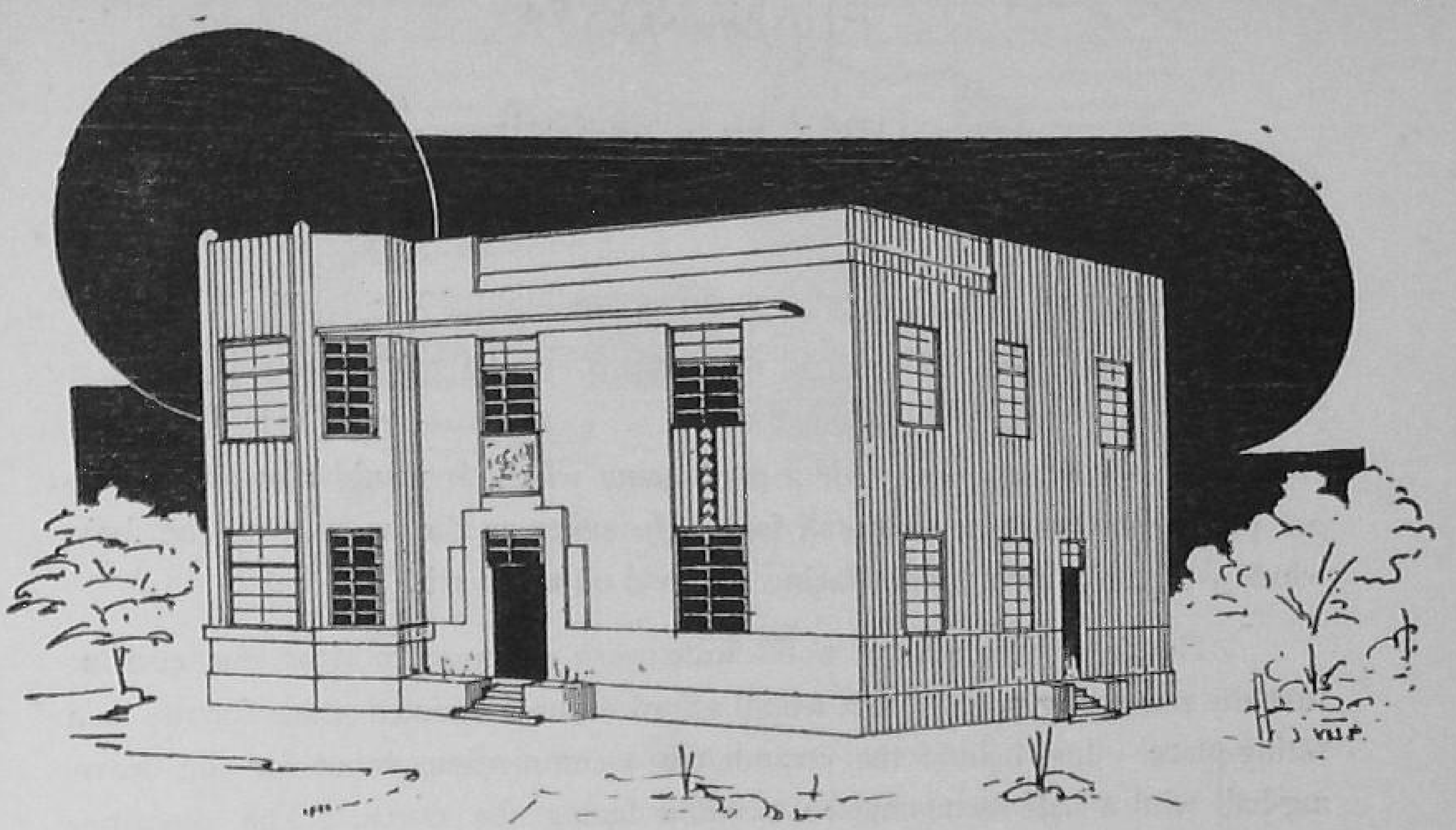


Fig. 195

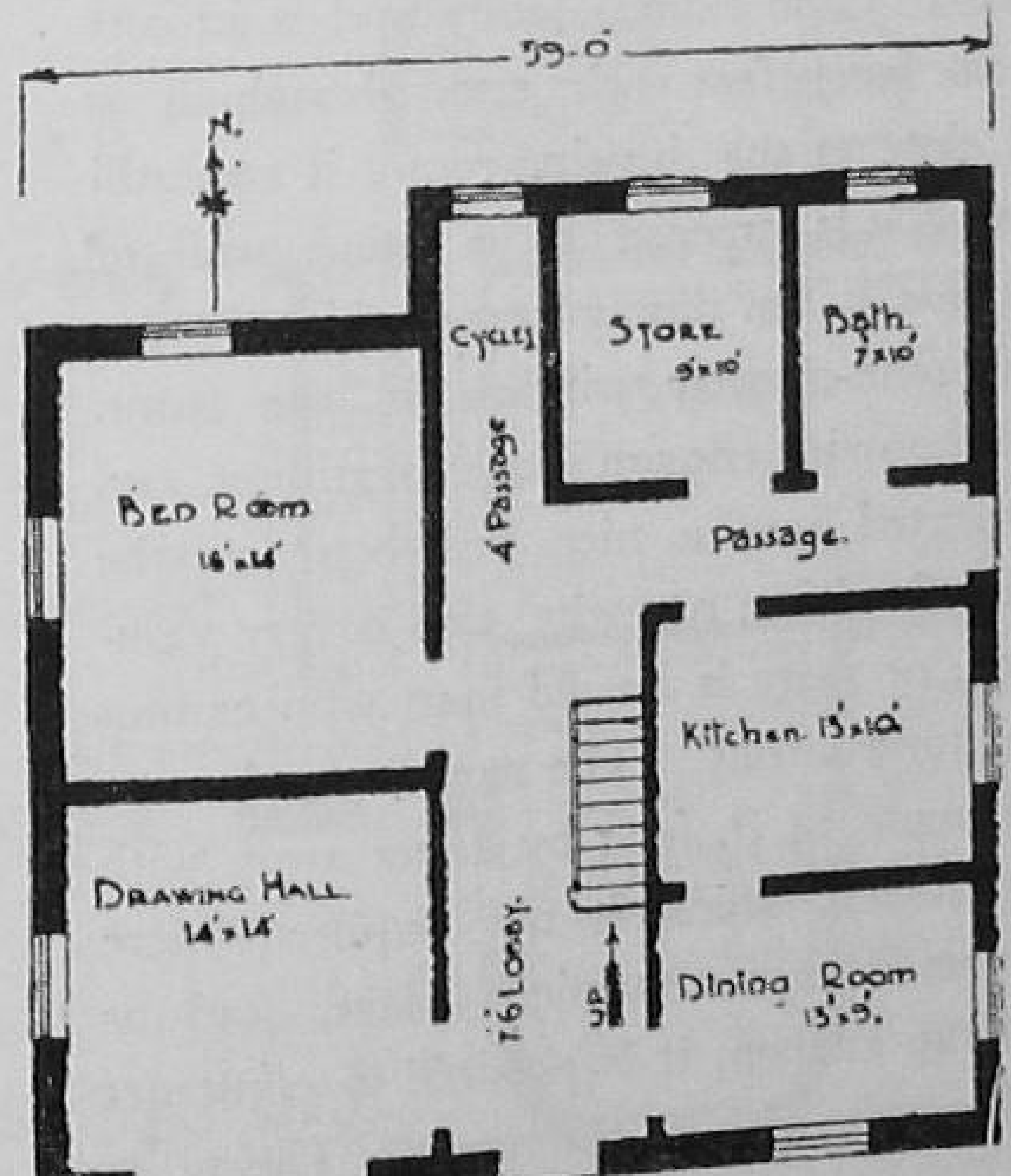


Fig. 196

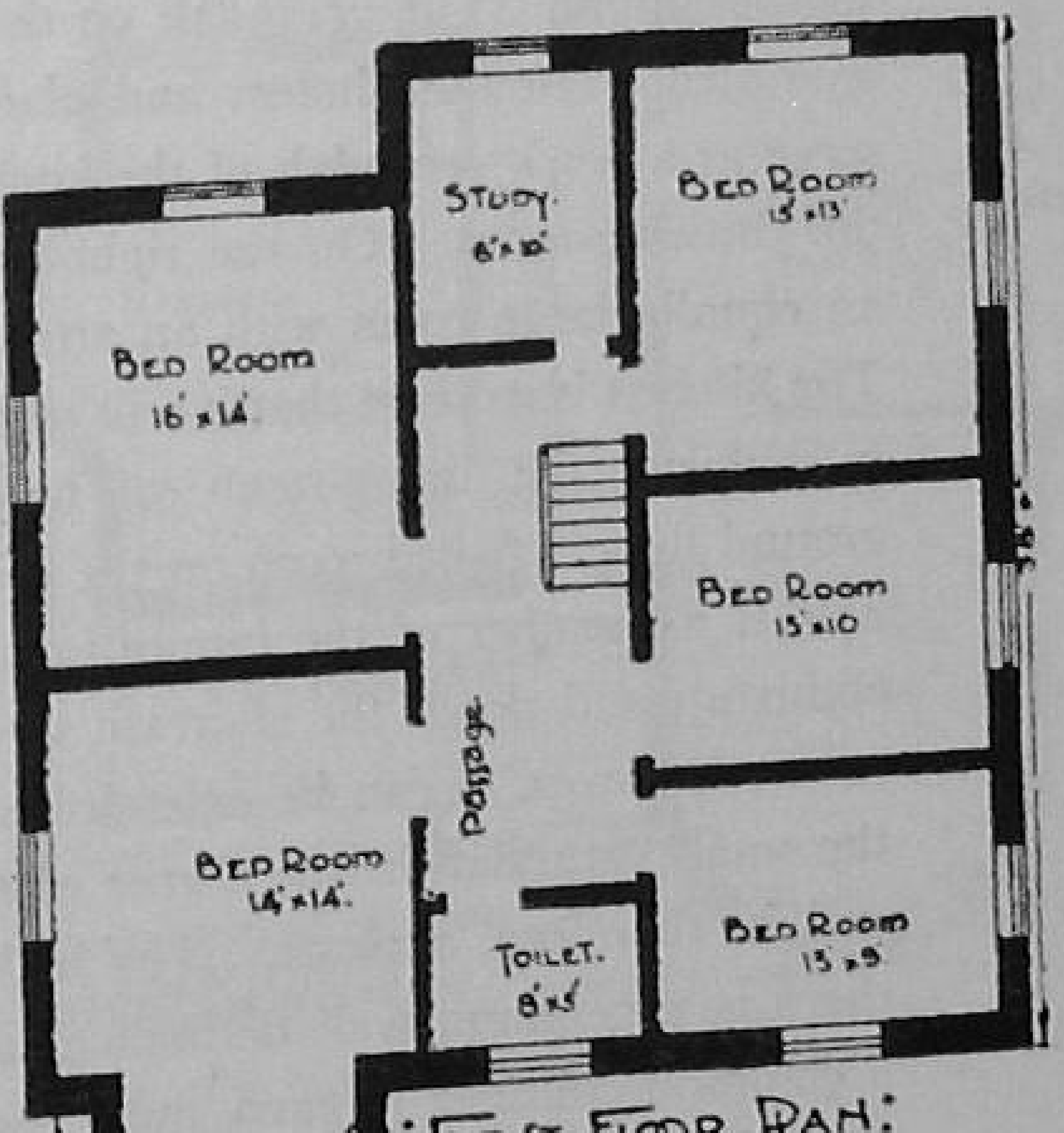


Fig. 197

PLAN NO. 74

Floor Area: 2,976 sq. ft.

Pre-War Cost: Rs. 9,500

COMPARED with the cost, the accommodation provided in this plan is not much, because the sizes of the rooms are large. It is, therefore, suited for a higher class of family with a large income.

The plan is designed for a plot facing west. It would also suit a corner plot, with the front verandah facing the street on the west and the bay-window of the drawing-room facing the road on the north.

The front verandah is 7′ 6″ wide, with entrance to it at one end, so that the remaining portion of it would afford an unobstructed space for use as a sitting-place. Just behind the verandah is a commodious room for the drawing-hall with a half hexagonal bay-window facing the north. The drawing-room is ventilated and lighted from three sides and the greatest prominence is given to it by placing it between two verandahs, one in the front and the other in the rear. In fact, if we imagine the central staircase as the axis of the house, the drawing-room is the only room on the left-hand side of the axis. The staircase is very conveniently situated in the central lobby and is in one straight flight. The verandah on the rear is ten feet wide and, though it is separated from the kitchen and placed close to the drawing-room, it can still serve as a work verandah of the kitchen, as it is screened by a blind wall of the drawing-room. On the right-hand side is the dining-room, which is also an equally large room with an attractive semi-circular window in the front. The kitchen is so large that it will certainly provide enough space for dining, and in that case the dining-room can be converted into a nice bed-room on the ground floor. A bed-room on the ground flood is a necessity, and is very valuable if a member of the family falls sick, or there is an old man who cannot climb up and down the staircase several times a day. The store-room is very small; however, it can be extended and made 14 ft. long by doing away with the small verandah in the corner of the kitchen, which is not required there and is, therefore, a waste. The bath-room is at a convenient place, and as there is a common wall between it and the kitchen, it is possible to construct a common chimney to carry away the flue-gases of both the rooms. The w. c. is well screened from sight.

On the upper floor there are three very large bed-rooms of equal size, viz., 14′ × 20′. A terrace is provided in the front, as well as in the rear, and both of them are independently accessible from any bed-room. There is at least one window in each bed-room, open to the west.

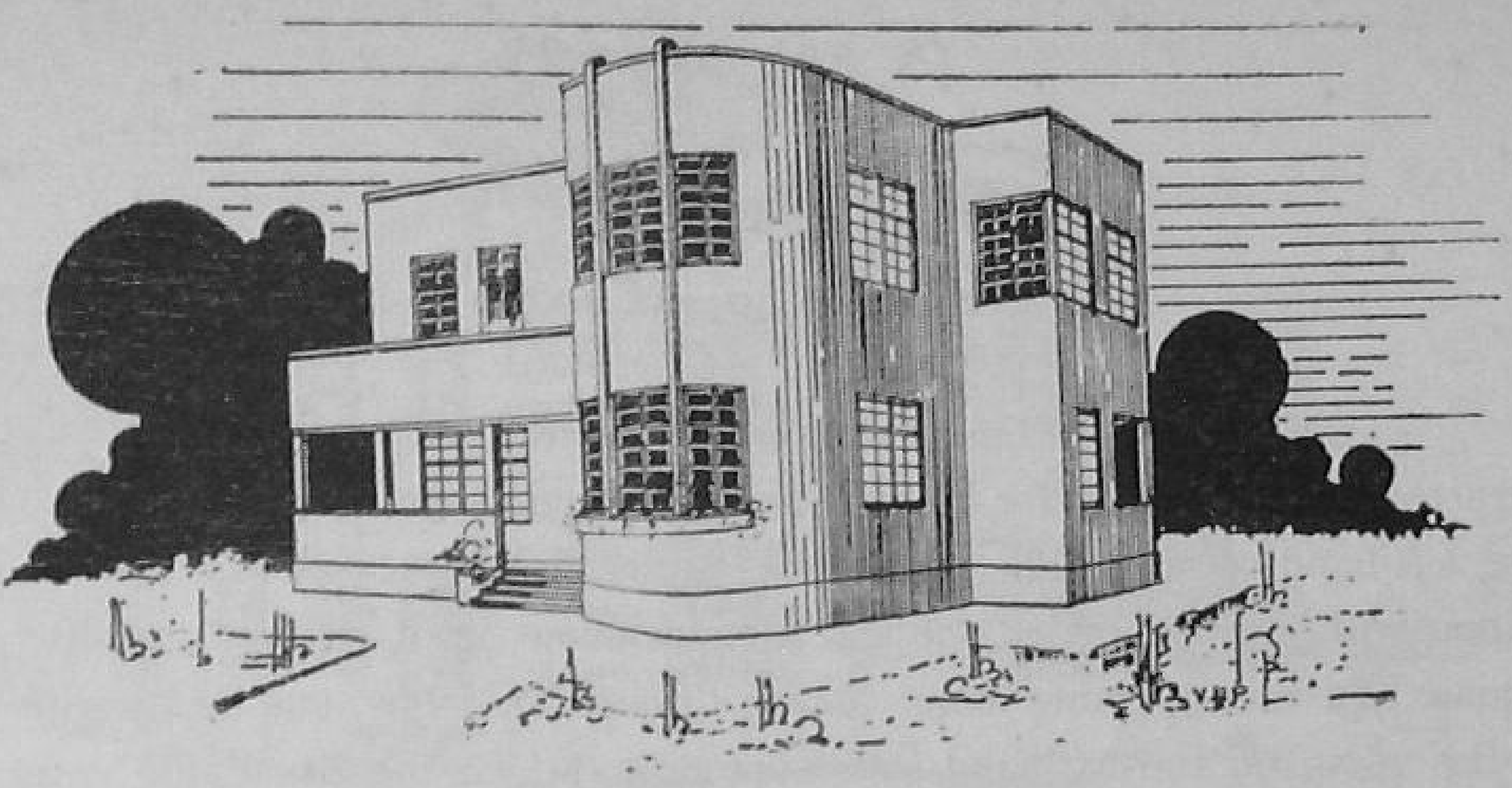


Fig. 198

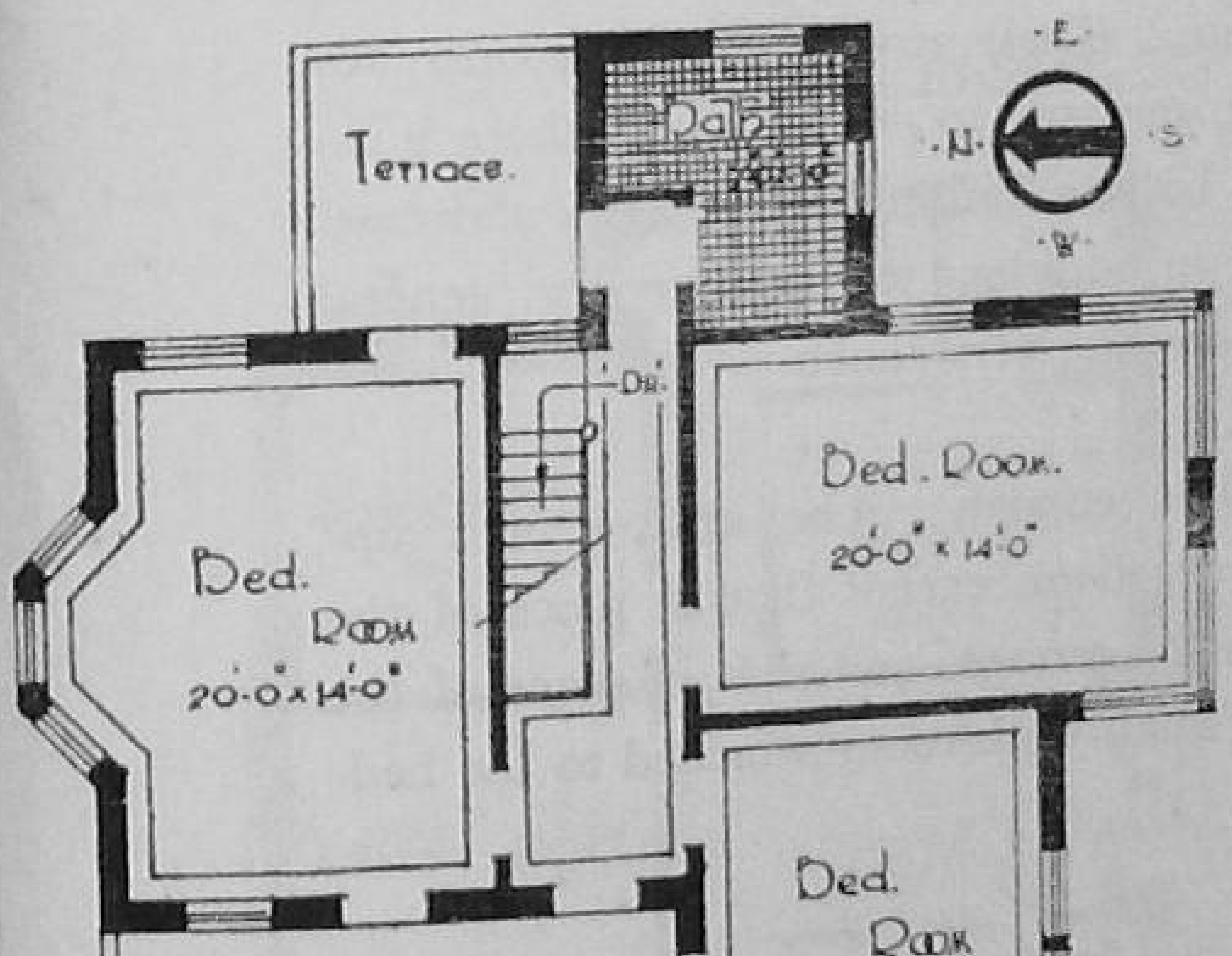


Fig. 199

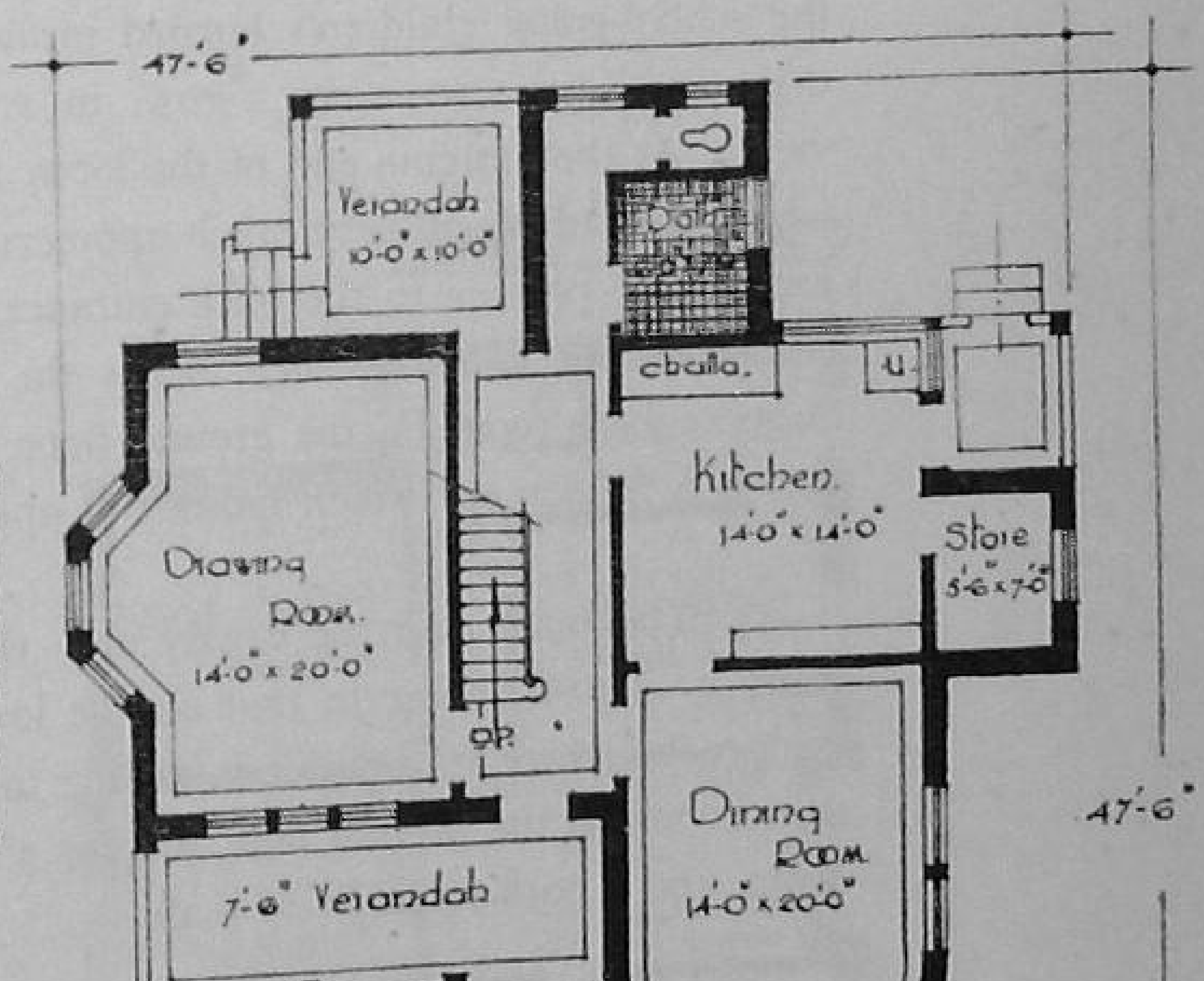


Fig. 200

PLAN NO. 75

Floor Area: 2,860 sq. ft.

Pre-War Cost: Rs. 10,700

THIS is a plan of one of the very best houses. It was designed and constructed by an engineer for his own use. The main entrance is on a side on the left-hand corner leading through a lobby to the reception room. The latter, with a semi-circular side and a bay-window in it, is approximately a square and is a charming room. Going through the lobby, one meets with the ladies' room on the left-hand side, opposite to which there is a side entrance and a back staircase. A staircase, other than the main one, adds greatly to the convenience in respect of circulation, and for servants particularly, it is a necessity. A kitchen on the right-hand side and the dining-room opposite to it form a very good grouping. Attached to the kitchen is a small store-room. The kitchen itself is a spacious room, capable of providing seats for dining for the school-going children's hurried meals, or for the morning tea. Behind it, there are two w.c.s in a row, in an inconspicuous position hidden from view. At the extreme end of the lobby there is a washing-place with a sink, which the ladies will very much appreciate. There are twin bath-rooms adjoining the passage to the back entrance, opposite to one of which there is an entrance door to the kitchen, below the bottom landing of the back staircase. A spare bath-room on the ground floor, in addition to the one for general use, is a refinement which ladies will appreciate very much.

The main staircase is easy and wide enough. The arrangement upstairs is almost similar to that on the lower floor, except that in place of the bath-rooms there is a staircase leading to the terrace, and that in place of the store-room on the ground floor there is a small wash-room attached to the bed-room, and a bath-room.

On the second floor, again, there is a large bed-room on top of the drawing-room, with a fully equipped bath attached, and on the entire remaining space, a terrace, with mosaic tiling, is made.

The paving in all the living-rooms is of polished Tandur, outer walls are of chisel-dressed stone-in-lime 18 inches thick, partitions of brick-in-cement mortar 4½ inches thick, the flooring and staircases of R. C. C., height of plinth 2½ ft., that of floors 10 ft., and concealed electric wiring. The sweeping, curved lines of the *chhajjahs* and ornamental W. I. grille-work in windows enhance the beauty of the home.

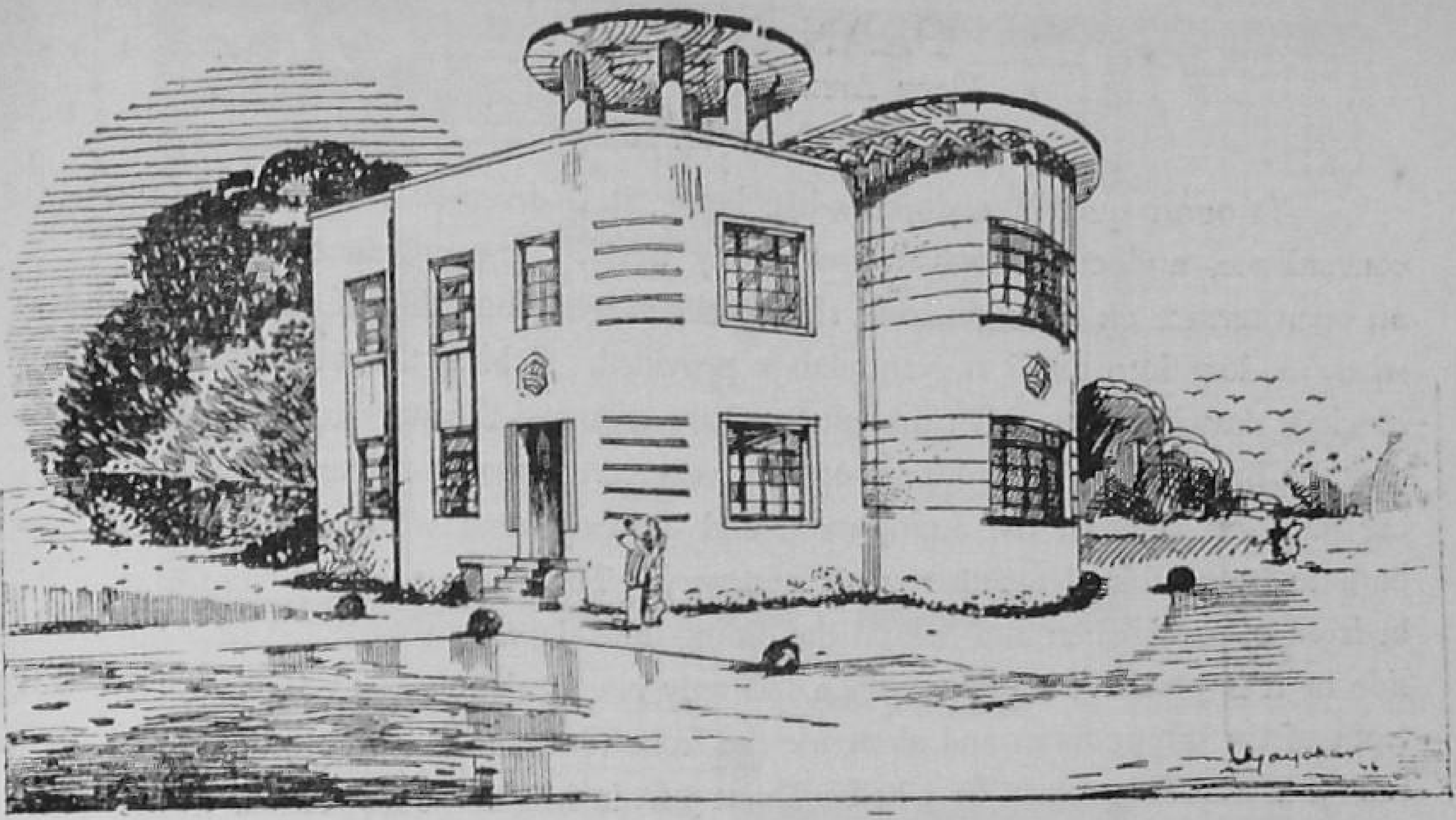


Fig. 201

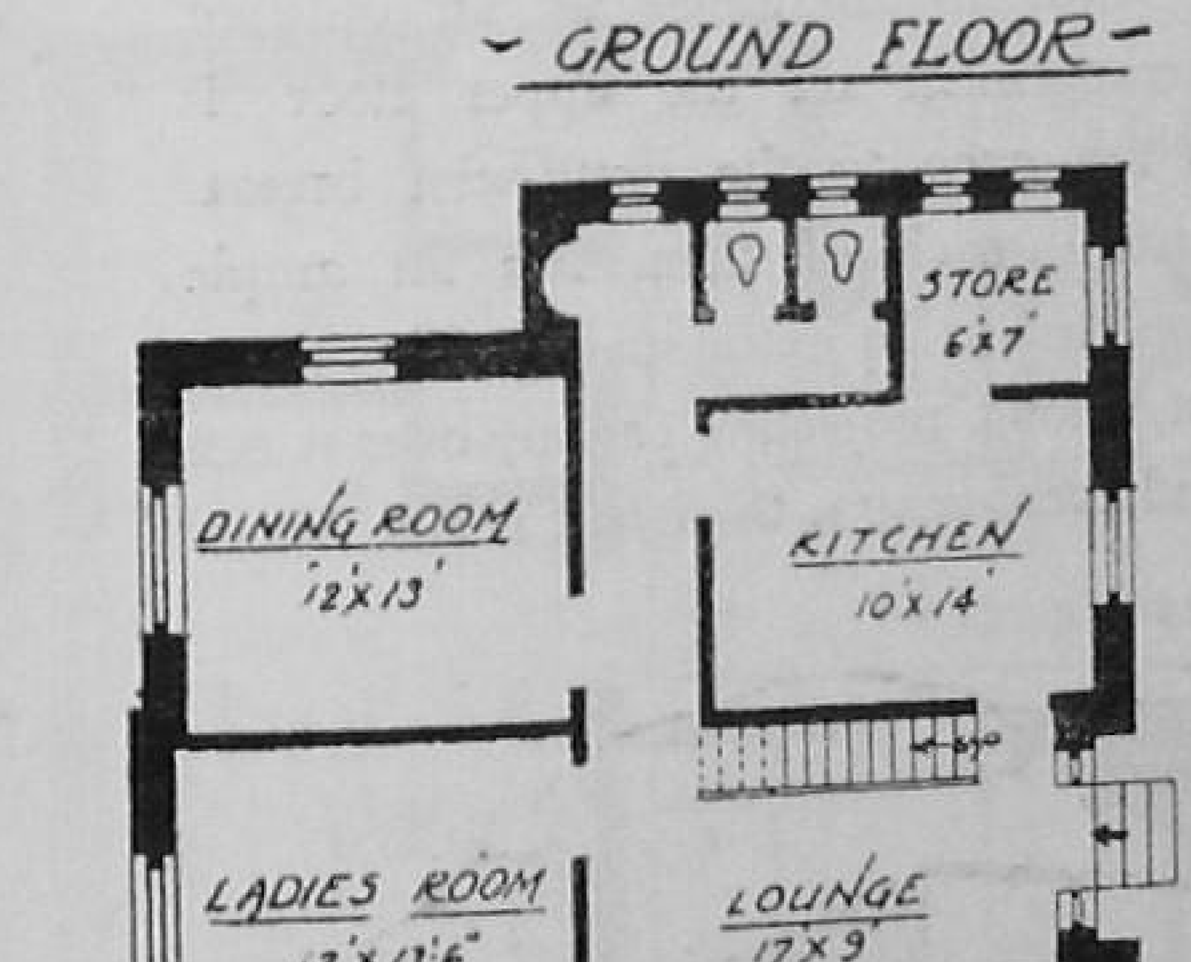


Fig. 202

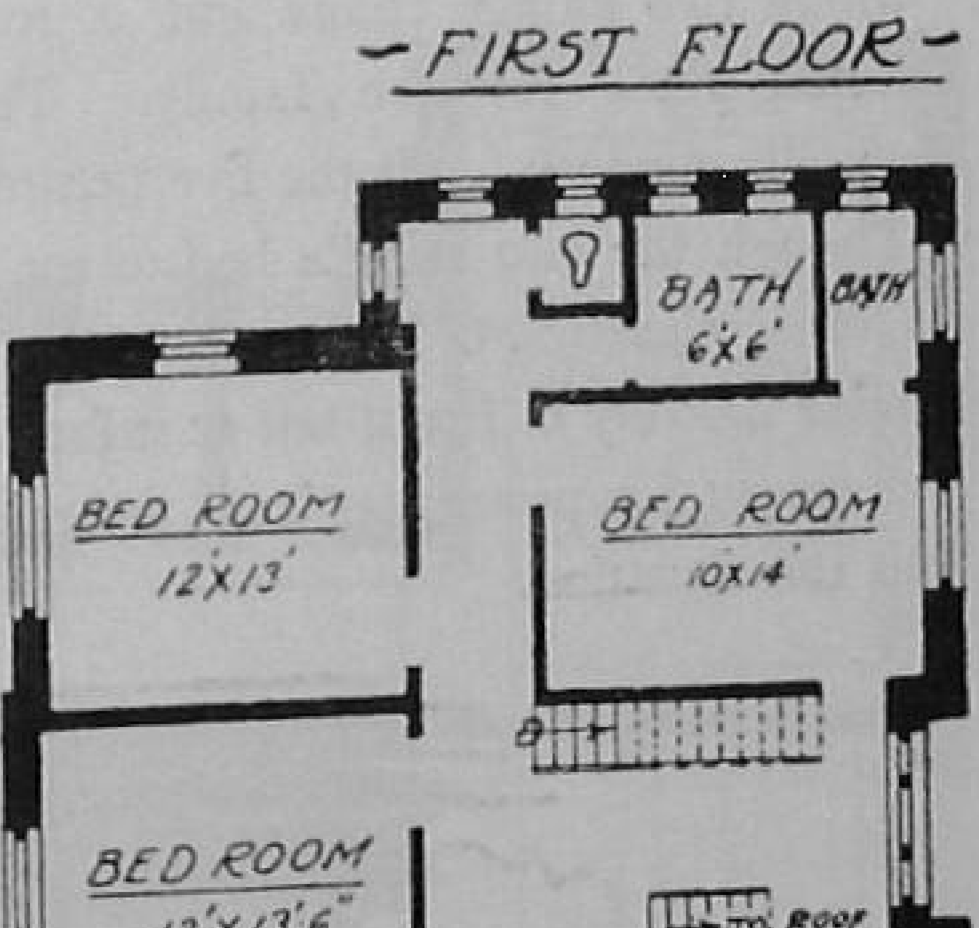


Fig. 203

PLAN NO. 76

Floor Area: 2,912 sq. ft.

Pre-War Cost: Rs. 10,850

THOUGH quite a plain, box-like house, it is designed for comfort and convenience, and embodies the present-day trend. The entrance opens into an open terrace on the right-hand side, enclosed by a long line of hedge, from where a door into the 8 ft. verandah is provided. Behind this verandah is a spacious drawing-room. On the left-hand are arranged the store-room, kitchen and the bath-room—all grouped together very conveniently. There is a folding partition between the dining-room and drawing-room which allows them both to be combined together when necessary. There is a spacious verandah in front of the kitchen and behind the dining- and drawing-rooms. Along one side of it is placed a staircase which has only one straight flight of steps. In front of the dining-room and alongside the front verandah is a large, open terrace, enclosed for privacy by a hedge about 5 ft. in height. This terrace would serve as an excellent outdoor dining-place. The ample open terrace on the right-hand side, which also is enclosed by a long line of high hedge, would prove an ideal place for children to play under the supervision of the lady in the ladies' apartment, or an outdoor sitting-room under the shade of the trees, where two lounge chairs and a teapoy show its usefulness as an outdoor resting-place for the family. The arrangement on the upper floor is equally modern. All the five bed-rooms are open to the south-west breeze. Though the two middle bed-rooms are small, each of them has an ample clothes closet of 6′ × 3′ size, which is provided in an extra space. There is a wide balcony in front, but as it faces west, a long, projecting canopy over it is a necessity for protection from the rains and evening sun, though it is not shown in the elevation.

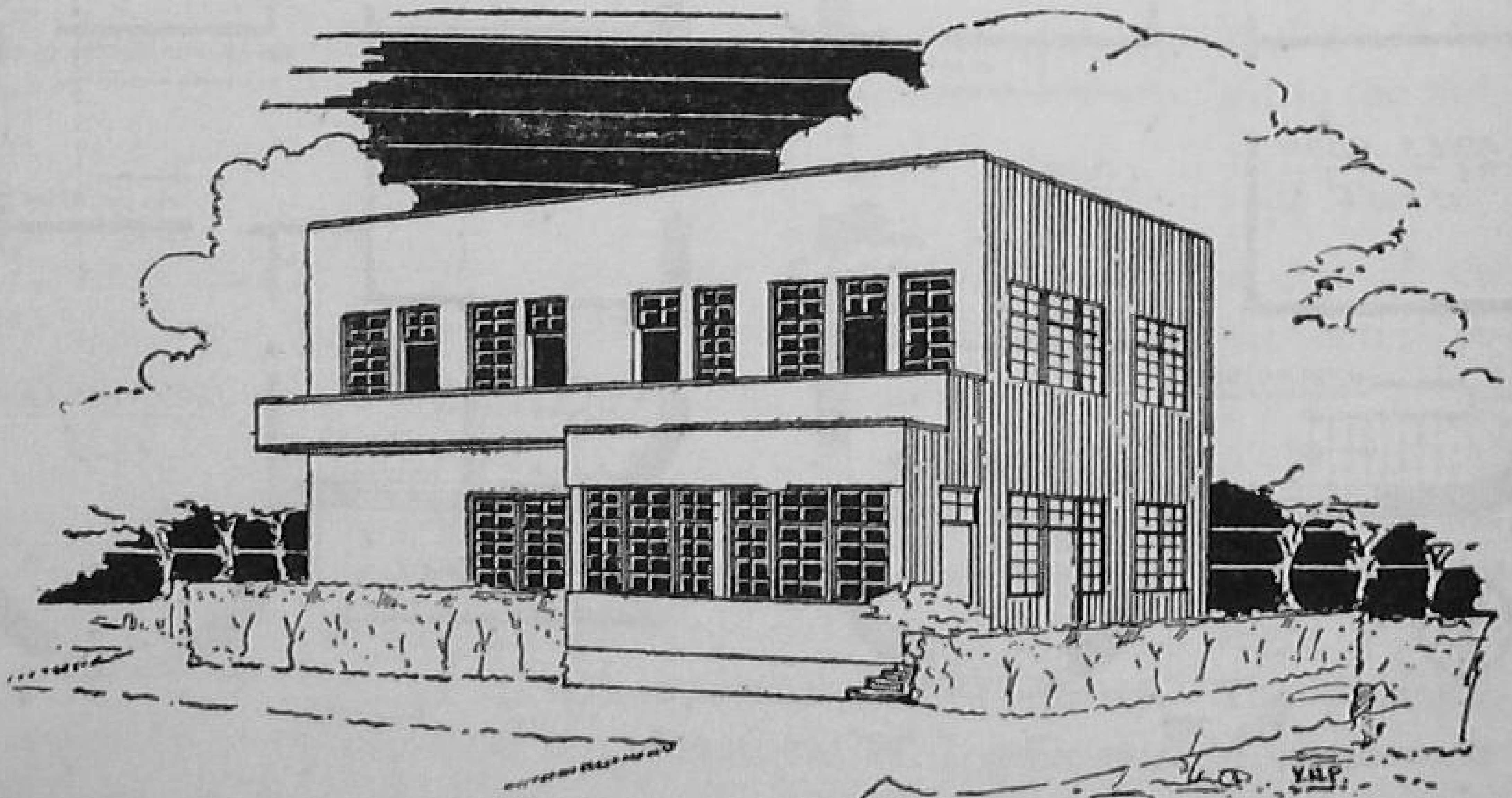


Fig. 204

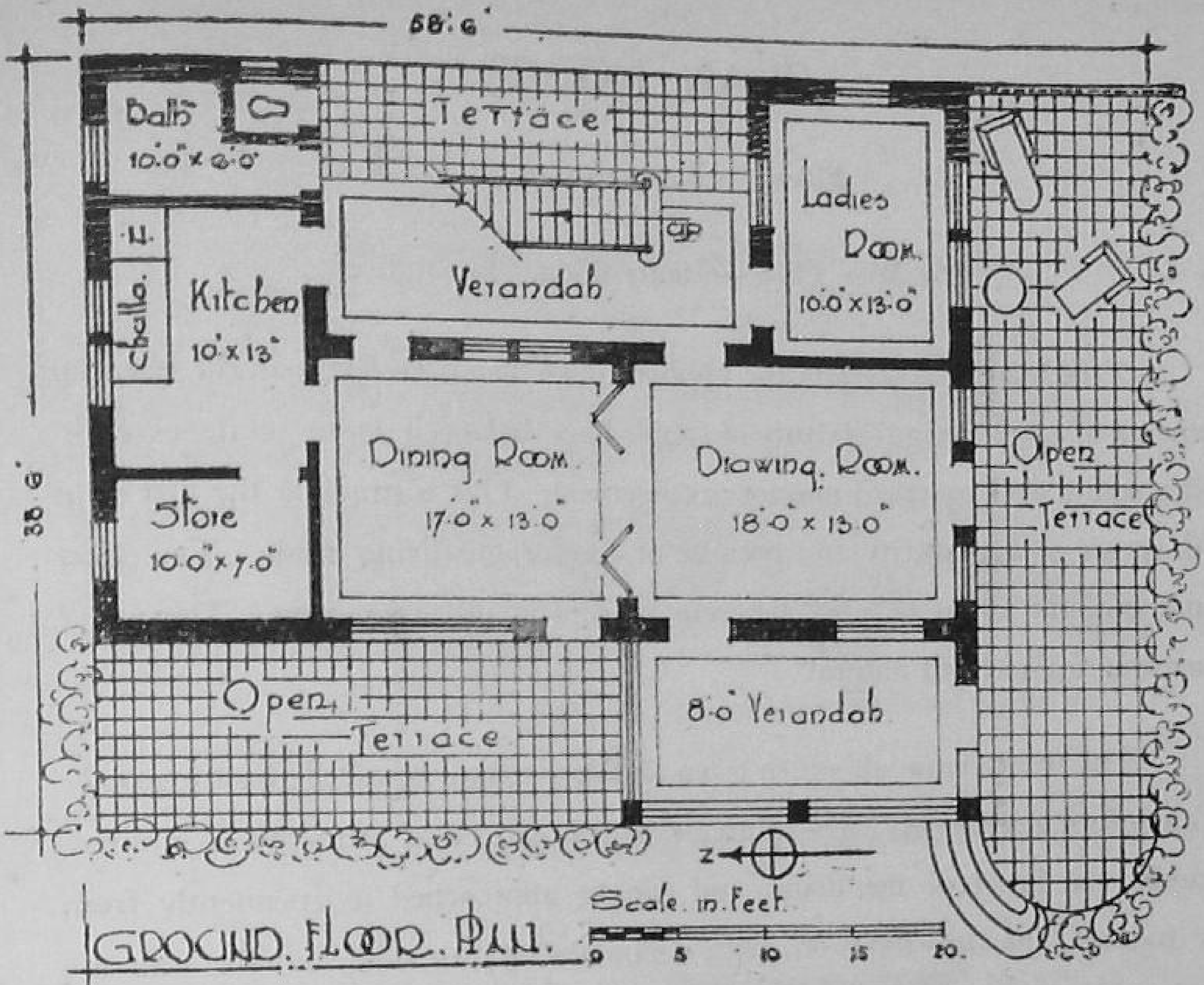


Fig. 205

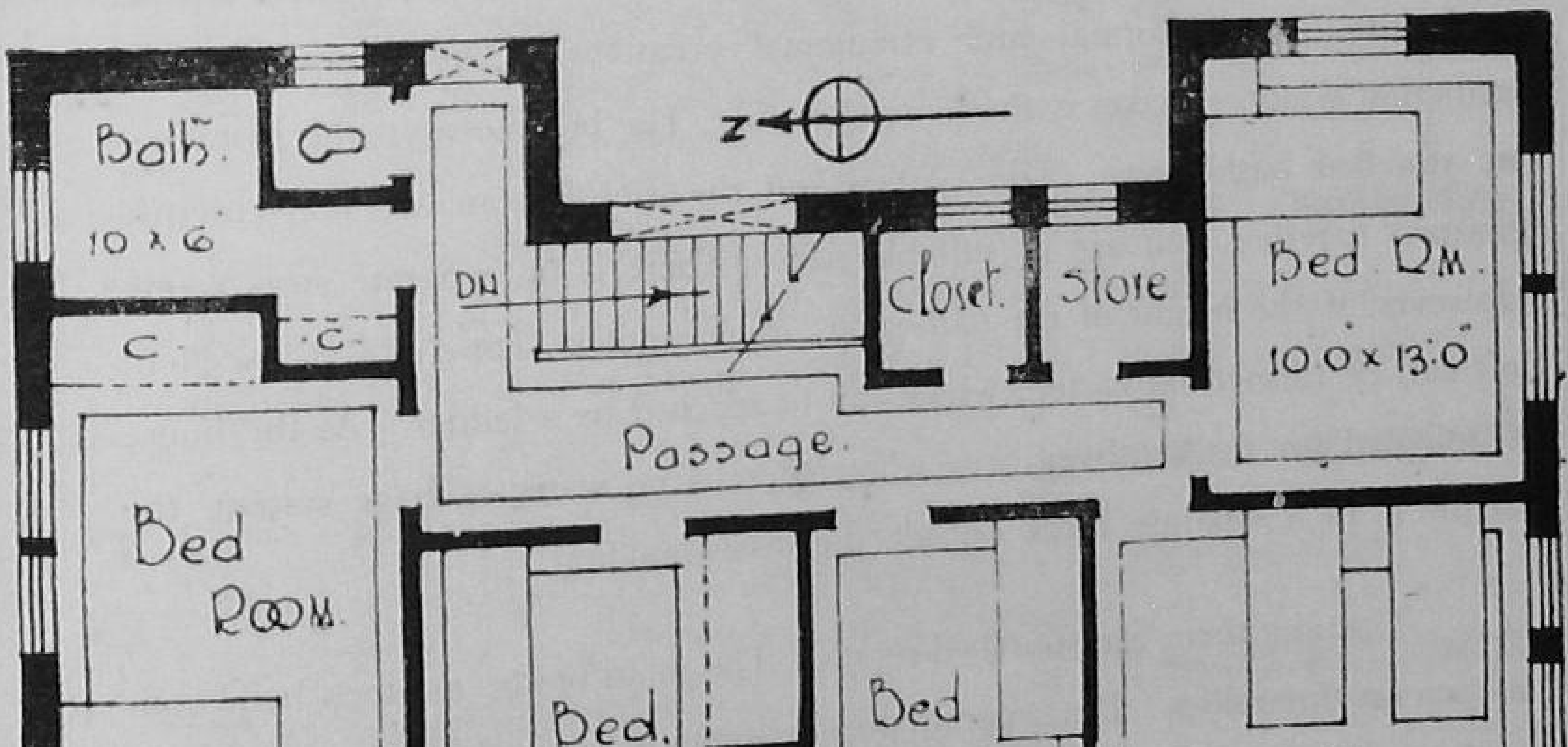


Fig. 206

FIRST. FLOOR PLAN.

PLAN NO. 77

Floor Area: 3,120 sq. ft.

Pre-War Cost of both floors: Rs. 13,800

The home pictured on the opposite page blends perfectly all the essential elements of a fine design—beauty of simple lines, balanced masses on the exterior, and a sound and practical interior arrangement. One is struck at the first sight with its air of domesticity and promise of comfortable living inside. The effect is not brought about by any elaborate attempt at picturesqueness. The whole scheme is original and natural.

The front verandah which is ten feet deep makes an excellent sitting place in an informal manner. The staircase, which can be as attractive as desired, occupies the heart of the home, and can be approached independently from any room. The drawing-room with verandahs on two sides and the staircase on the third is as if isolated from the private rooms of the house, and is thus most suited for all formal and ceremonial occasions. The wide sweeping segmental window makes it the more cheerful. The bed-room on the front has an attached bath-room. The kitchen and the dining-room are conveniently grouped together and are of suitable sizes. There is no separate store-room. However, if the height of the bath-room adjoining it is kept 7 ft., an excellent loft can be formed on its top, which can be reached by a ladder. As the house is designed for the moffussil area where there is no water carriage system, the latrine is in a separate block outside the main building.

Upstairs there are four bed-rooms. The main or the master's bed-room is open on three sides. If a separate dressing-room is required it can be provided in the gallery at the back with an entrance from inside the bed-room.

The same staircase leads to the flat roof terrace on the top of the main bed-room.

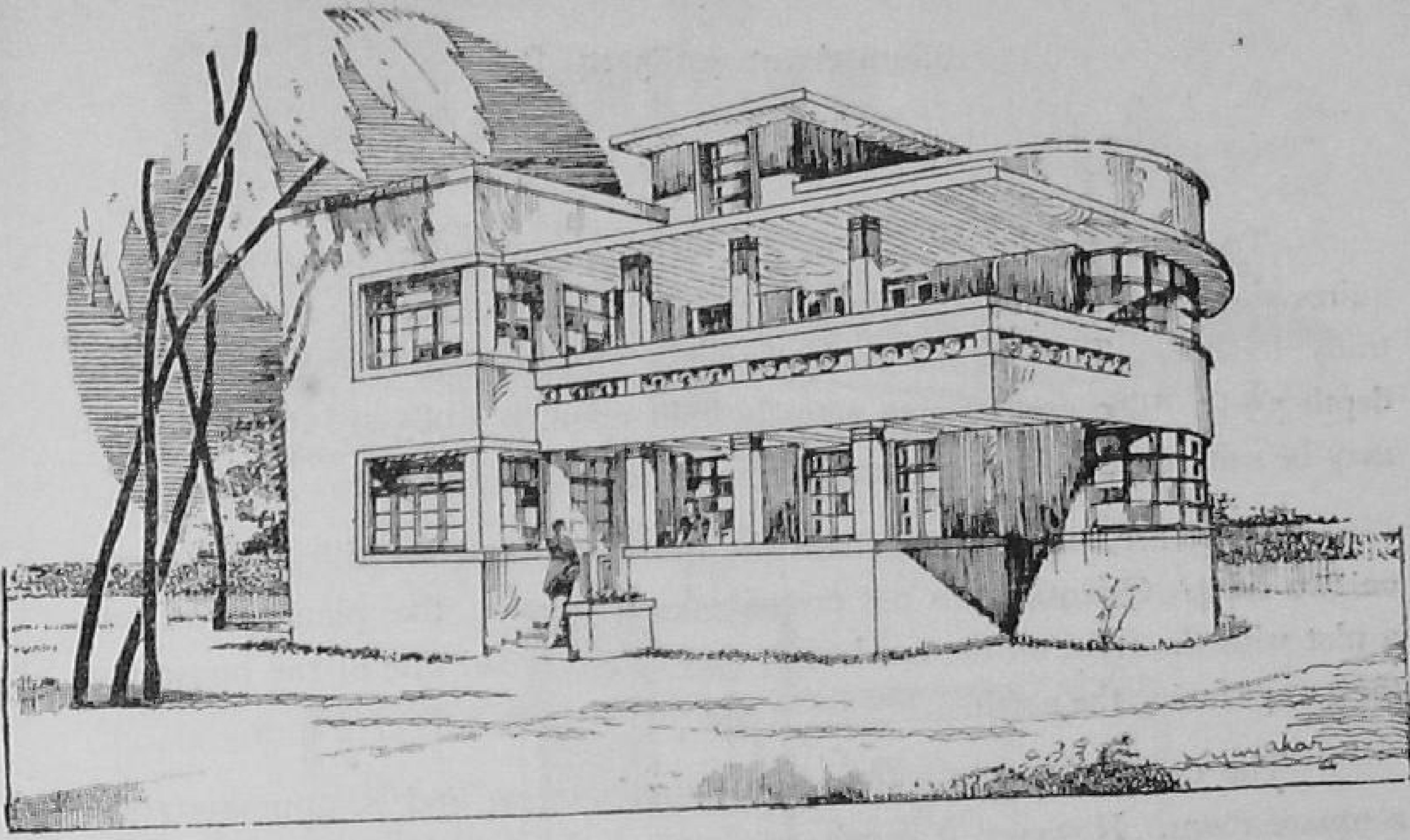


Fig. 207

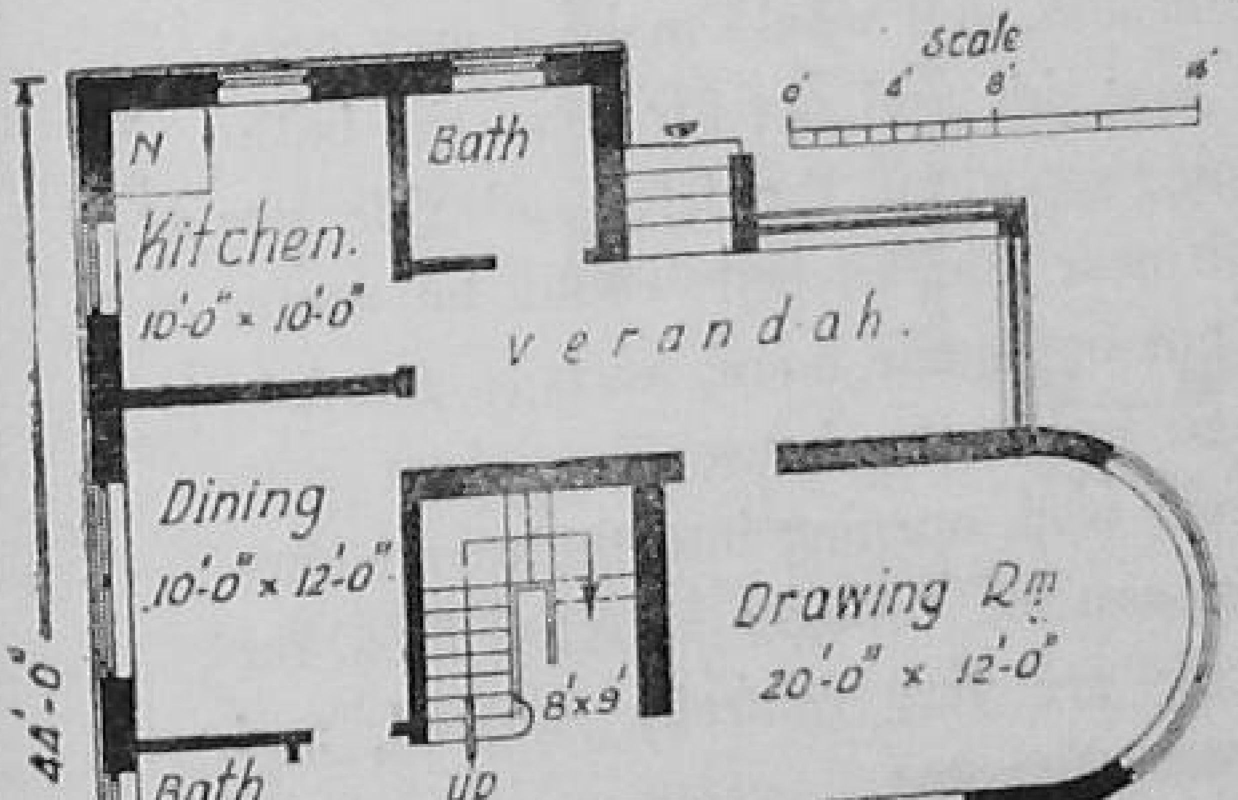


Fig. 208

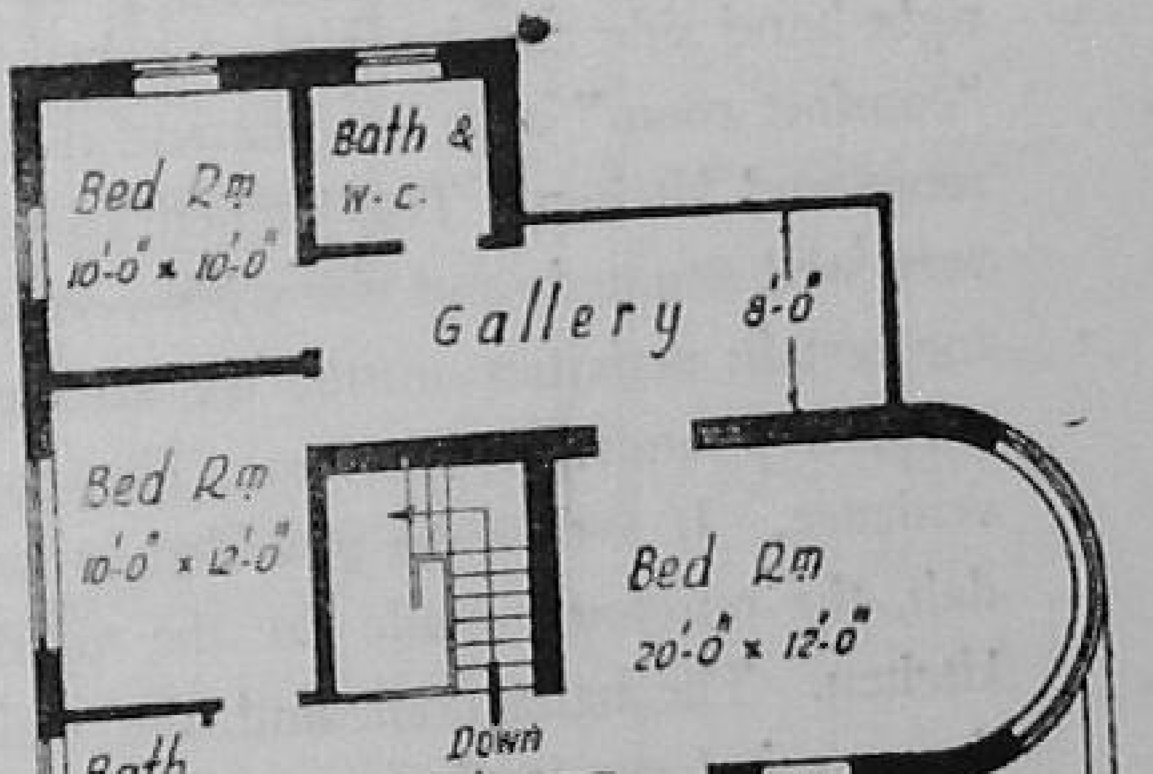


Fig. 209

PLAN NO. 78

Plinth Area: 3,185 sq. ft.

Pre-War Cost: Rs. 10,960

To BUILD the largest possible house for a certain amount of money requires simplicity of design, square corners, rectangular rooms, and halls centrally located. This is one such design. The frontage is about 60 ft. and depth 35 ft. The ground area actually built upon, is 2,085 sq. ft. This plan may be suitable also for a corner plot.

There are spacious verandahs the full length and breadth of the house on two sides. Orientation is not prescribed. However, the plan would suit a plot with the front on the north side, that is, the broad side of the house and the garage facing the north.

The drawing-room occupies the central position and is, approximately, a square room. However, it can be made a couple of feet larger by curtailing the width of the passage behind it from 6 ft. to 4 ft. The office-room on the right-hand side can be used as a bed-room also, and would make a very good "comfort room" as it is situated on the west side and not far from the bath-room and kitchen. The kitchen and dining-room on the left-hand side are very well situated, and the wide verandah near the kitchen would be useful for certain activities outside the kitchen but inside the house, such as grinding corn, or pounding spices, etc. The garage inside the house is a great convenience. If a door be provided in its rear wall, opening into the rear verandah, the purchases made in the market can be brought directly into the kitchen. The bath-room and the staircase are very centrally situated, and they are independently approachable from every room.

On the first floor there are five bed-rooms, four of which are of ordinary size and one, the master's bed-room, large. The bath-room on the upper floor is just above the bath-room on the ground floor and there is a very large deck on three sides.

The plan is quite simple with a rectangular outline, that is, all the corners are square. The slight curved lines of the verandahs add to the elegance, but not to the cost, as they are quite simple curves and not carried beyond the ground floor. It occupies an area of roughly 2,100 sq. ft. of ground and the built-up area of the upper floor is only 1,100 sq. ft. The house with six bed-rooms, including the office room on the ground floor, would be very suitable for a large family.

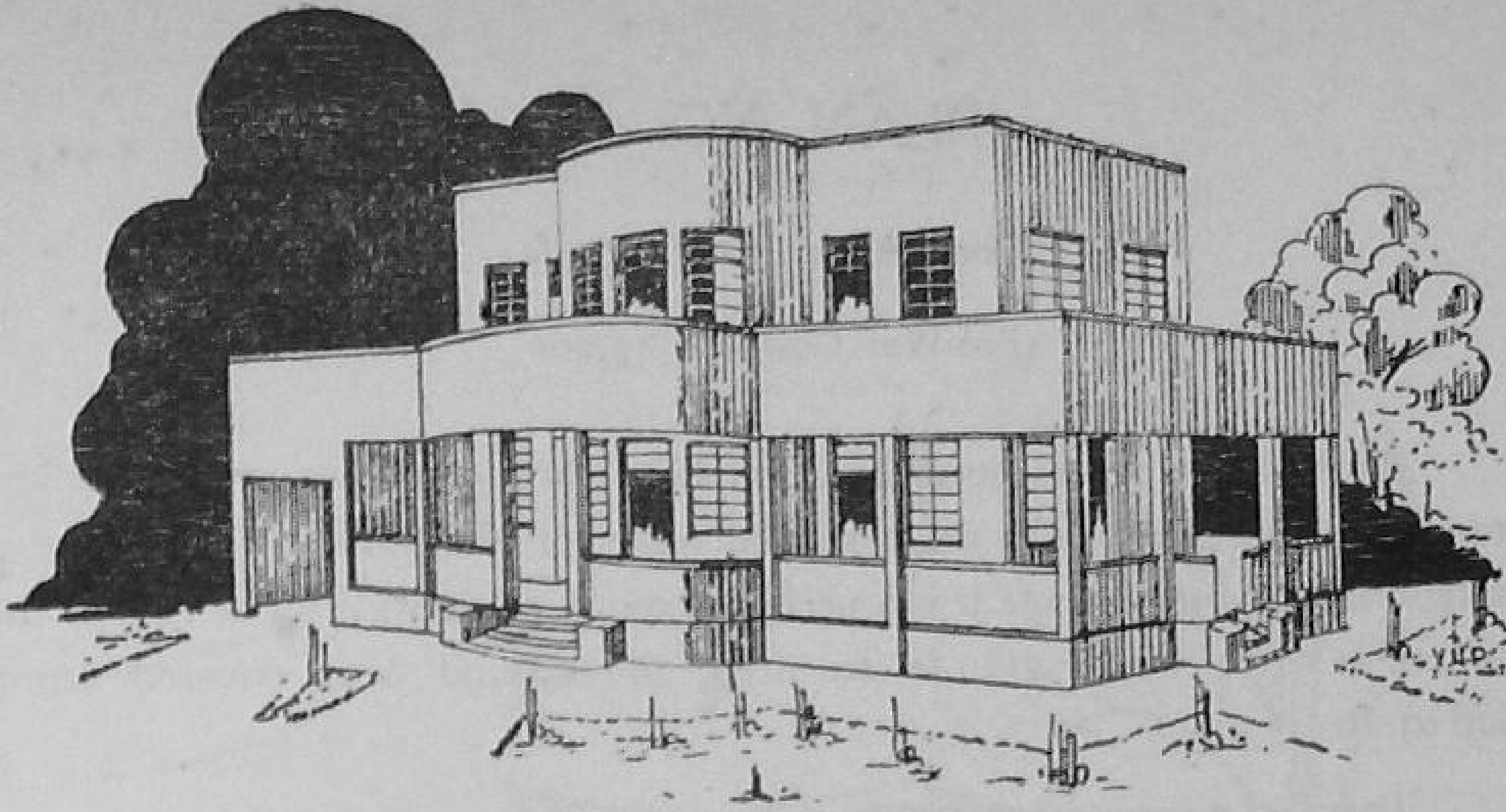


Fig. 210

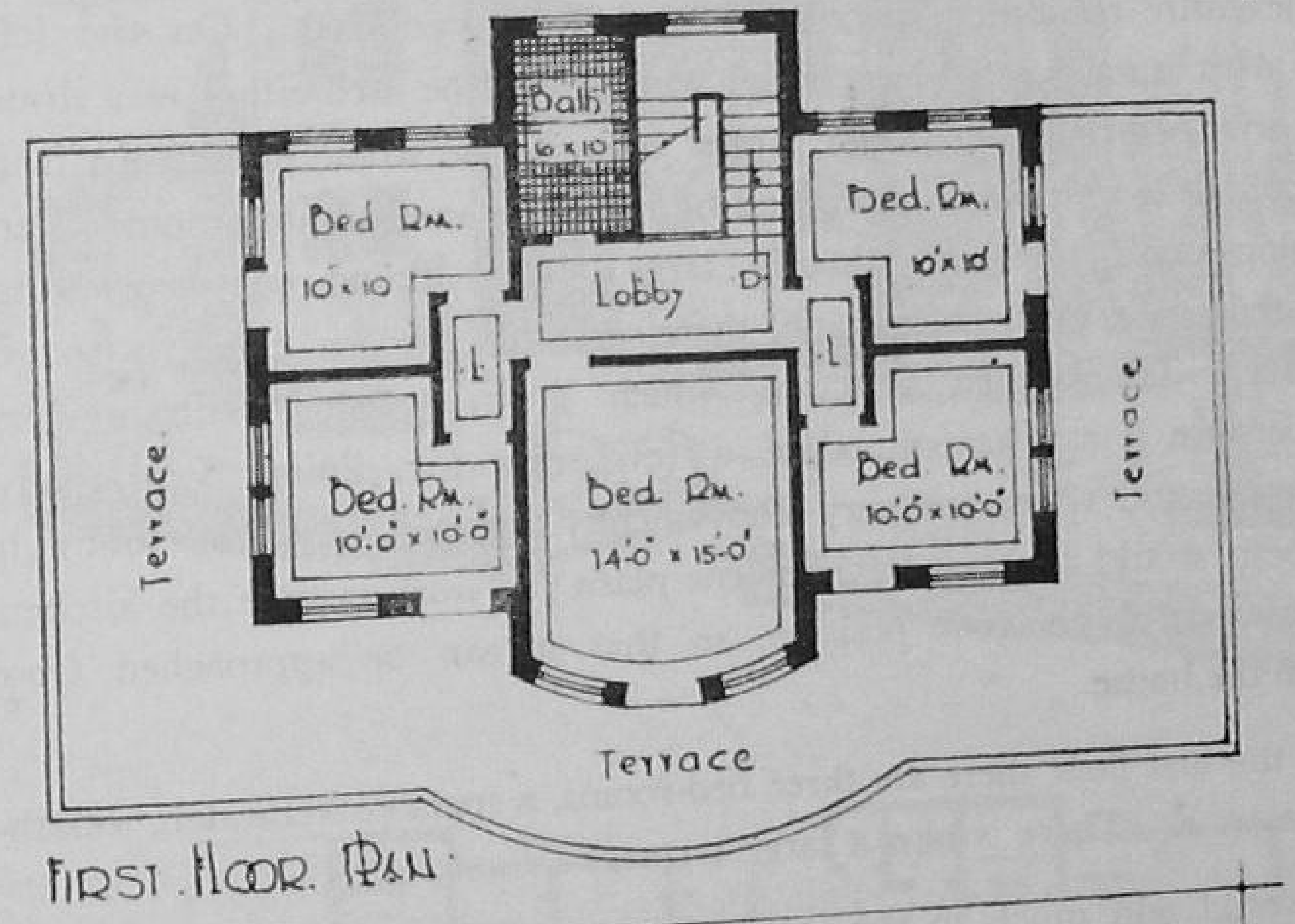


Fig. 211

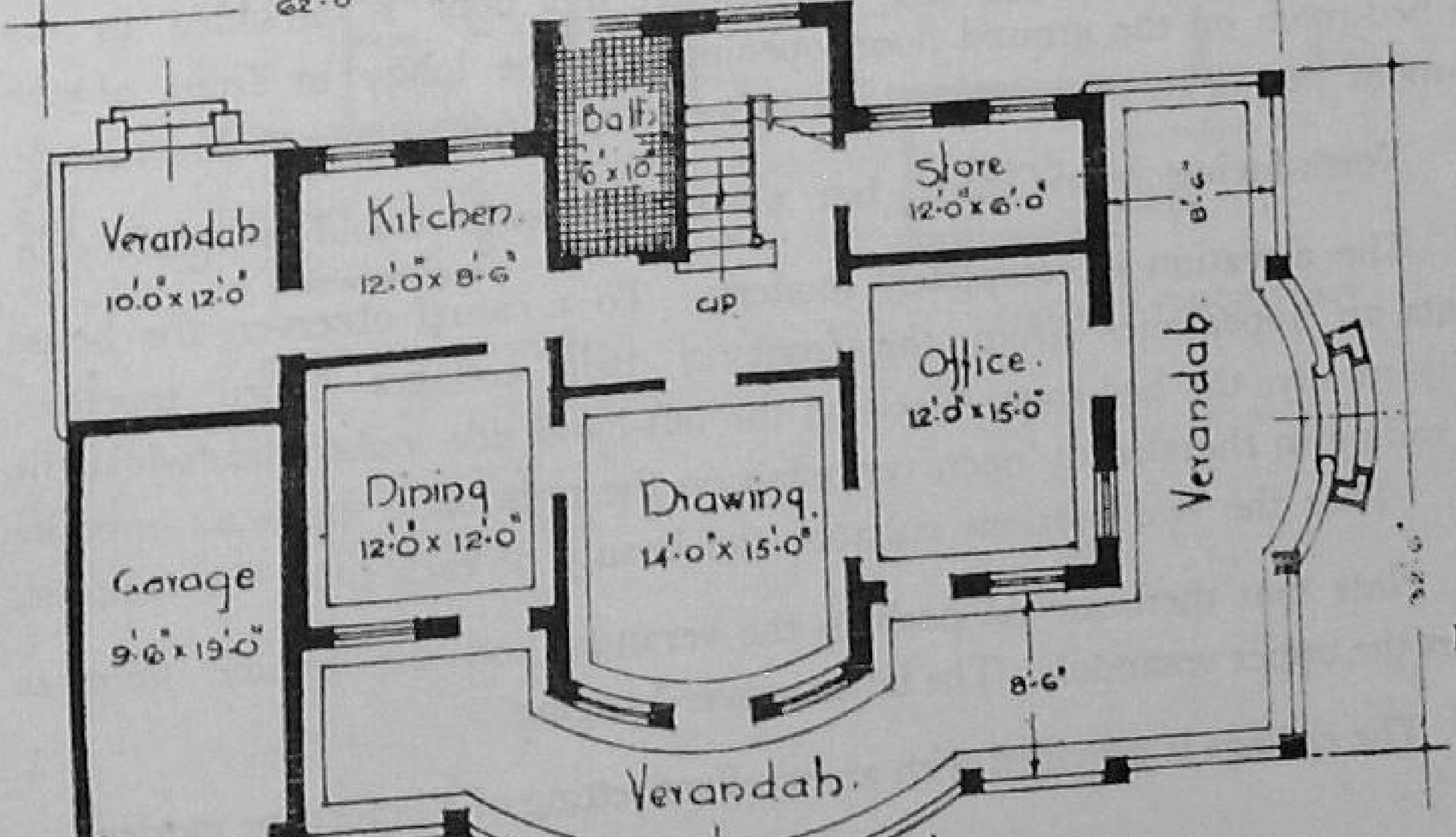


Fig. 212

PLAN NO. 79

Floor Area: 3,266 sq. ft.

Pre-War Cost: Rs. 11,200

THIS design represents utility, simplicity, and combines some excellent arrangements of plan to suit the particular needs of the family for whom it is intended, and for their use it is a perfect home in every way. The size of the structure is 51 ft. broad and 41 ft. deep, the ground area covered being 1,828 sq. ft.

There is a verandah in front, 8 ft. wide, with an entrance at one end, so that the entire remaining space could be freely occupied. On the left-hand side of it is an isolated large room which could be used either as a drawing-room or a bed-room. It is the largest room in the whole house. In front of the verandah is a drawing-room, and by its side, a small dining-room. Very often dining-rooms are unnecessarily large. The dining-room constitutes the least used space in the house and, therefore, the modern trend is to reduce its size. The kitchen is large, which is in keeping with modern practice, because it can accommodate a few seats for dining occasionally. The bath-room and w. c. are very conveniently situated, and the lobby in front of them would serve as an excellent place for work outside the kitchen. The staircase has a very good position, so that it can be approached from any room in the house.

On the first floor there are three bed-rooms, a spacious verandah, a bath-room and a w. c. There is also a large terrace.

It would add much to the convenience if a door is provided in the large bed-room on the ground floor, opening into the lobby in front of the bath-room just below the one on the upper floor for entering the terrace.

North-facing is indicated, but a western aspect would be preferable.

The elevation is completely modern. To a casual observer, the house presents an appearance from the front of twin cottages joined together. Architecturally, the bed-room block on the left-hand side looks solid, while the open railing in the already open verandah on the right-hand shows an opposite effect. Thus the two portions enhance the beauty of each other by contrast.

Note that there are no posts in the verandah on the ground floor to support the upper verandah. The latter is over-hanging.

The cottage is provided with an excellent setting of a landscape garden.

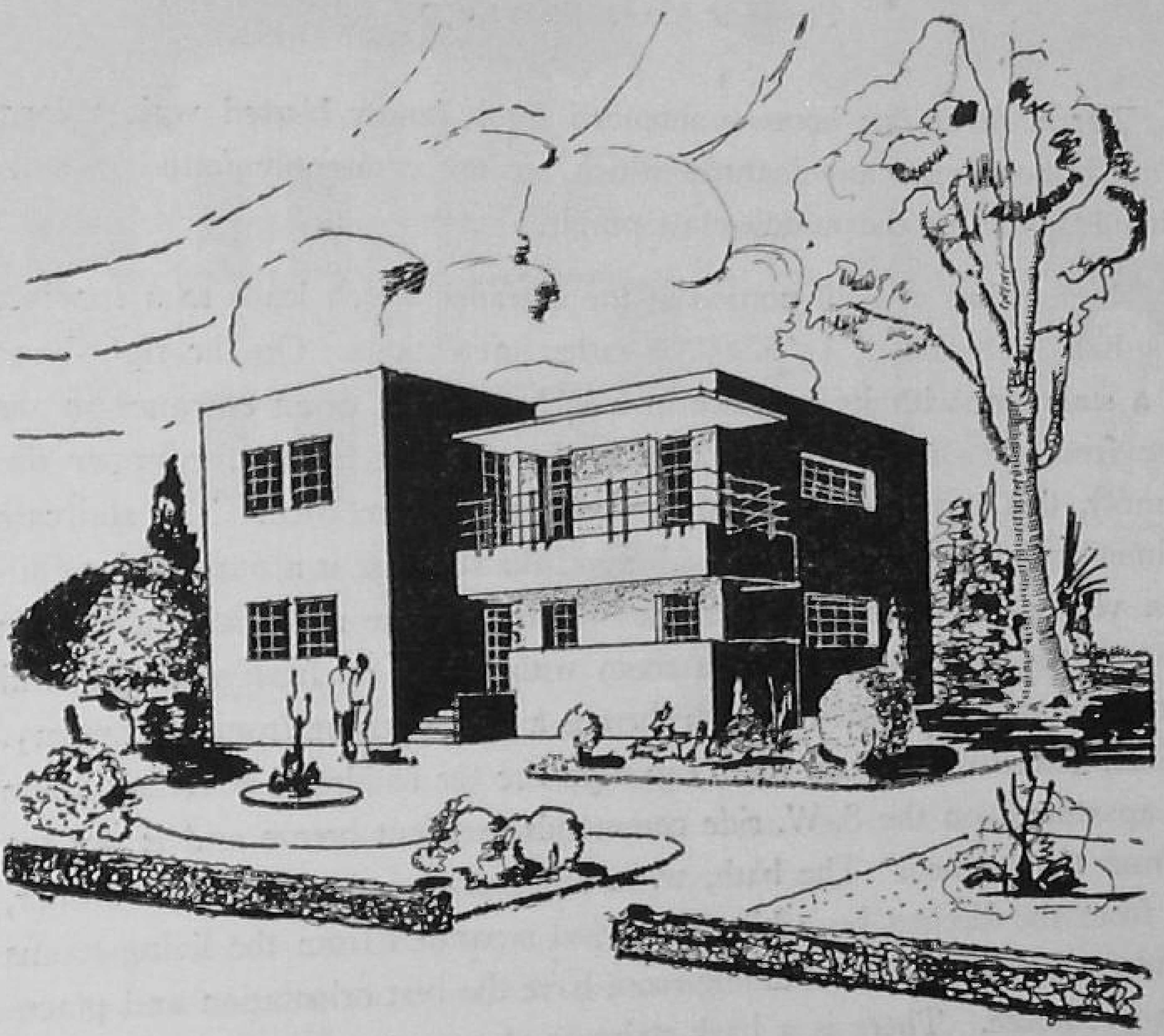


Fig. 213

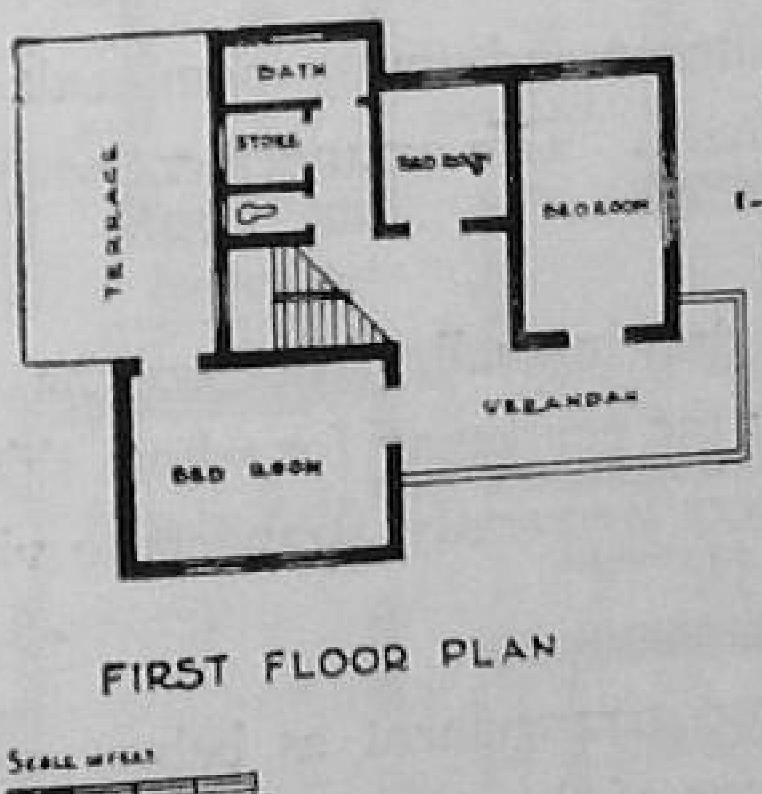


Fig. 214

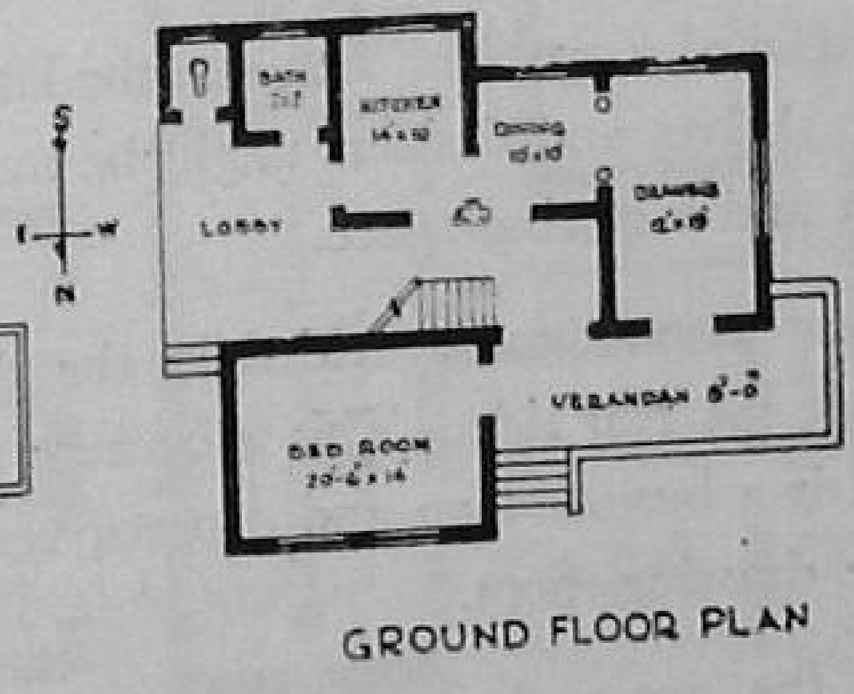


Fig. 215

PLAN NO. 80

Floor Area: 3,340 sq. ft.

Pre-War Cost: Rs. 11,670

THE plan of this home is intended for a family blessed with a large income. It possesses many features which are not commonly found in ordinary homes built for the middle-class people.

There is just a small portico at the entrance which leads to a spacious drawing-hall. The latter, 15′ × 25′, is rather pretentious. On the right-hand side is a staircase, with its entrance in a lobby. There is an entrance to the staircase from the outside also, so that in the event of letting the upper flat to a family, this convenience would be very much appreciated. The staircase is continued right up to the terrace. Beyond the staircase is a nursery for children—a very good room with a single window on the south and a double window on the west, supplying the room with plenty of fresh air. Beyond this is the female apartment to which there is a door opening from the nursery. Thus the ladies sitting in their room can supervise the children's activities. The female apartment on the S.-W. side commands excellent breeze and is not far away from the kitchen. The bath, w. c. and washing-place are in a corner, cut off from the kitchen by a blind wall and separated from the living-rooms by a lobby. The kitchen and dining-room have the best orientation and placement in the house. There is a back staircase at a very convenient place—an amenity sure to be very much appreciated.

Instead of a partition between the kitchen and dining-room, a deep cupboard with shelves and drawers might be made. This arrangement serves both as a screen and a storing space.

There is no door provided in the drawing-hall, either on the dining-room side or the rear side. This is because the gentleman for whom this home is designed is a businessman and expects, very frequently, strangers to visit and occupy the drawing-room.

On the upper floor, either the same arrangement as below may be made, or as many as five bed-rooms, with one of them having a large dressing-room, can be arranged. The sanitary service rooms are placed on the top of those below.

The elevation is quite modern. The surfaces are smooth and plain, and reliance for beauty is entirely on the bold outline, mass effect, fenestration and landscaping. The effect, however, is marvellous as will be seen from the way in which it soothes the eye.

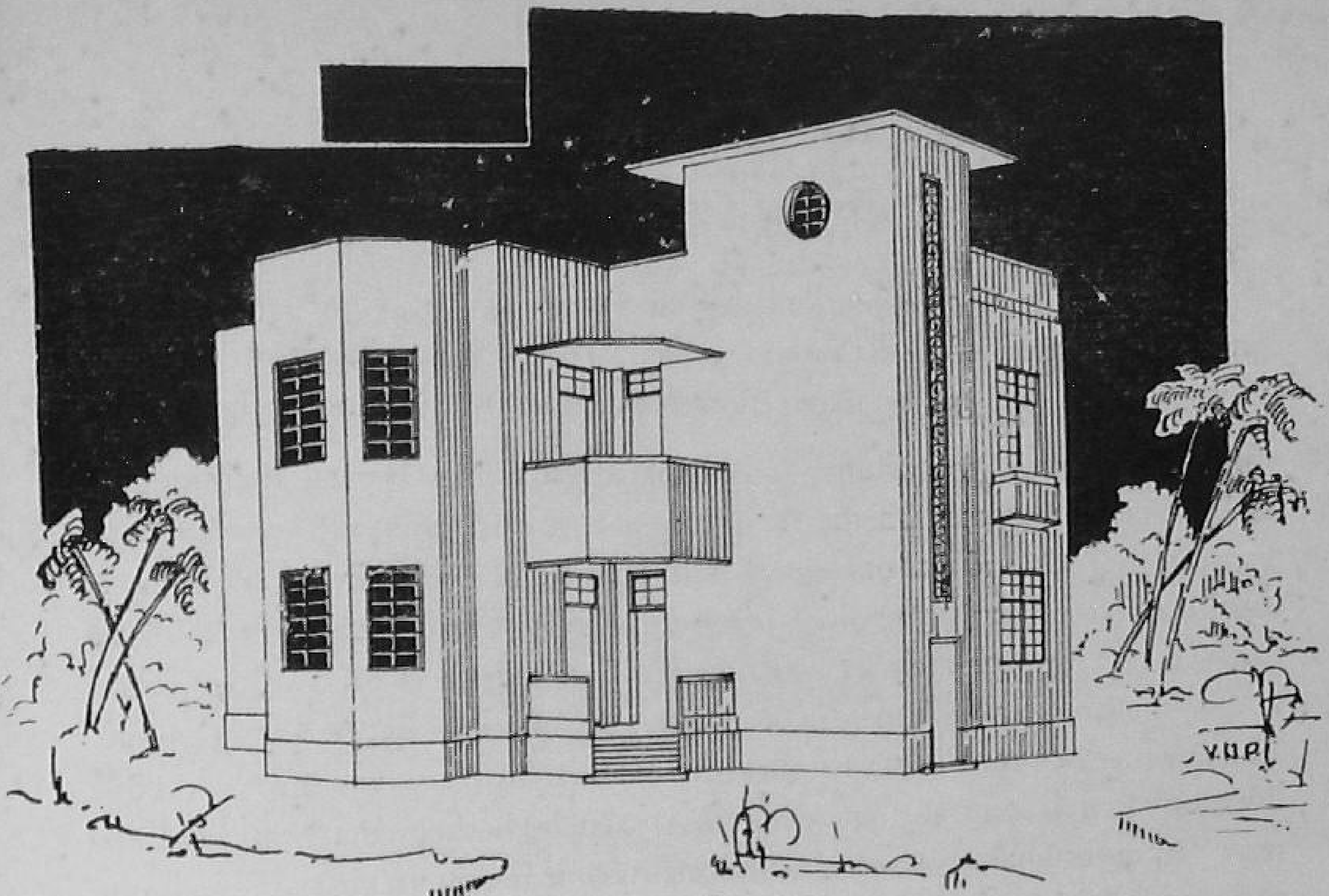


Fig. 216

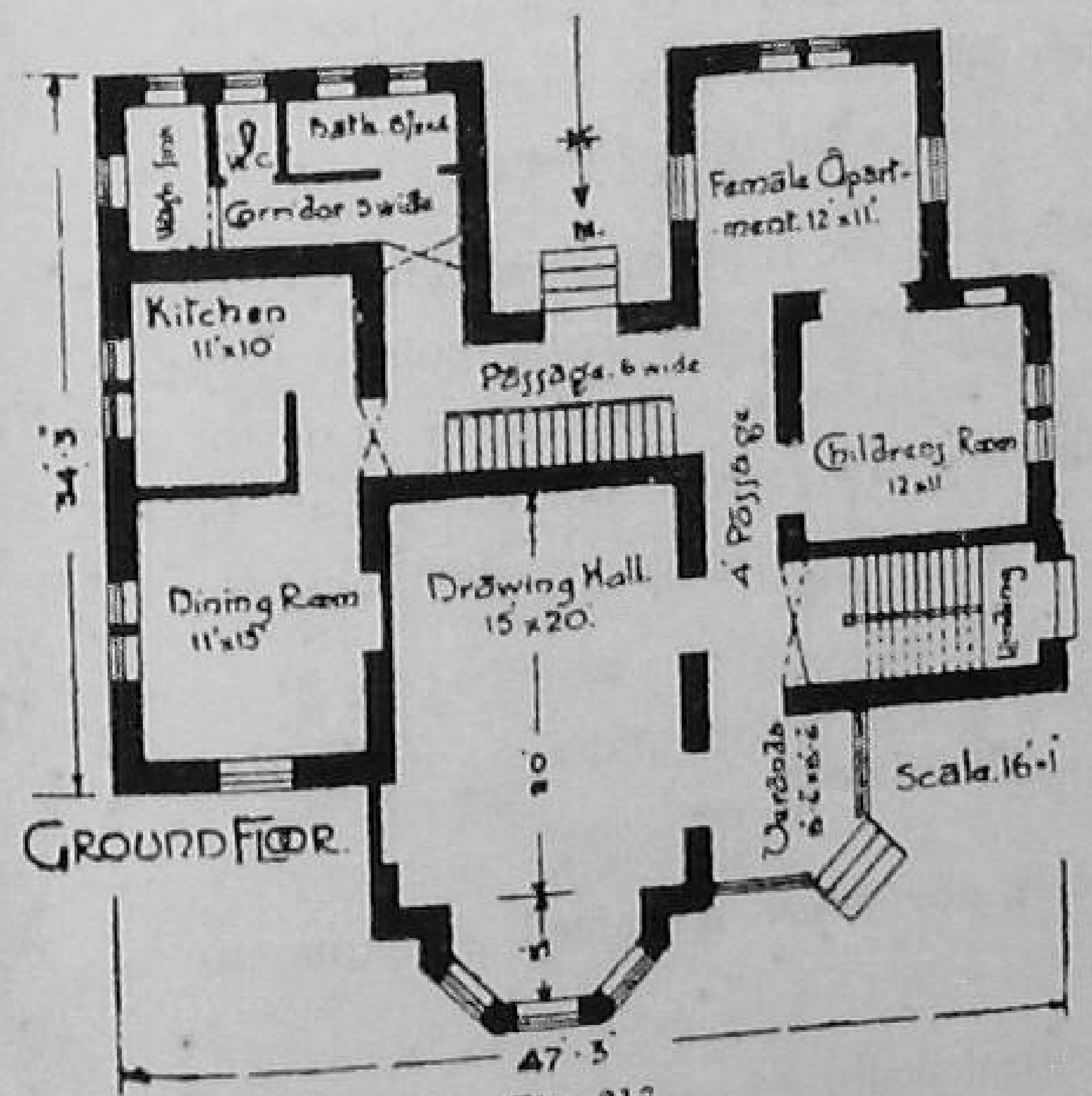


Fig. 217

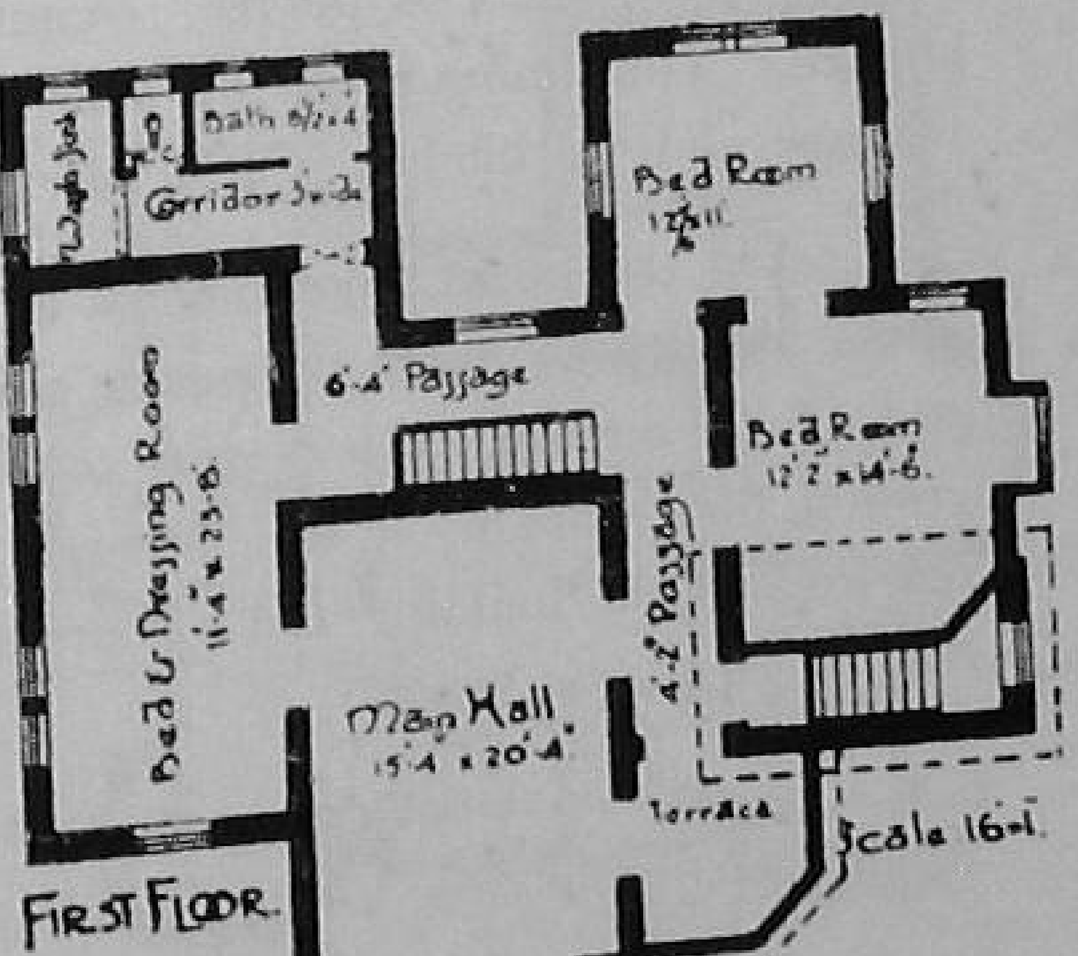


Fig. 218

PLAN NO. 81

Floor Area: 3,765 sq. ft.

Pre-War Cost: Rs. 15,000

A HOUSE of *chhajjahs* and balconies may be the name appropriately given in the case of this charming villa. The weather shades of the front verandah and the gallery above are shaped like overhanging arches.

The central verandah is projecting about a foot beyond the sides for an architectural effect. On the right-hand side is a spacious and easy staircase lighted in front and on one side. The position of the staircase is such as would admit of the upper floor being used either by the same family or by another, if it be separately let. On the left-hand side there are two bed-rooms and a small room which may be used either as an ante-room or a study room. The central bed-room has an attractive semi-circular bay-window. A large drawing-room is centrally placed, with verandahs both in the front and the rear. In an ordinary cottage, the drawing-room is usually treated as a common room and, if bed-rooms are arranged on its sides, a passage is usually provided to them through the drawing-room. But in this particular plan, in which more attention is given to refinements of a civilised family rather than to economy, separate passages are provided on both the sides. There is a small bath-room provided close to the bed-rooms, to be used in common. This is a further refinement as there is another common bath-room for general use near the kitchen. The dining-room is a very lively apartment with a semi-circular bay-window and the kitchen is very spacious, close to the dining-room.

On the upper floor there is a gallery in the front and balconies at the sides. Besides, there are three good sized bed-rooms, a large living-room, a bath and a large terrace. It is possible to arrange a full suite of rooms here as on the ground floor, and let it to a separate family. There is a roof terrace of the full area of the building and a staircase has been provided at the back for reaching it.

A sanitary block consisting of two w. c.'s., a urinal and a washing-place is built separately close to the main building.

Thus, considered in all the aspects, the house is indeed a luxury to live in.

All the outer walls and the two central walls, viz., in the front and rear of the drawing-room on the ground floor, and living-room on the upper floor, are made 14 inches thick. These reduce the span and make the flooring and roof simple and light.

Fig. 219

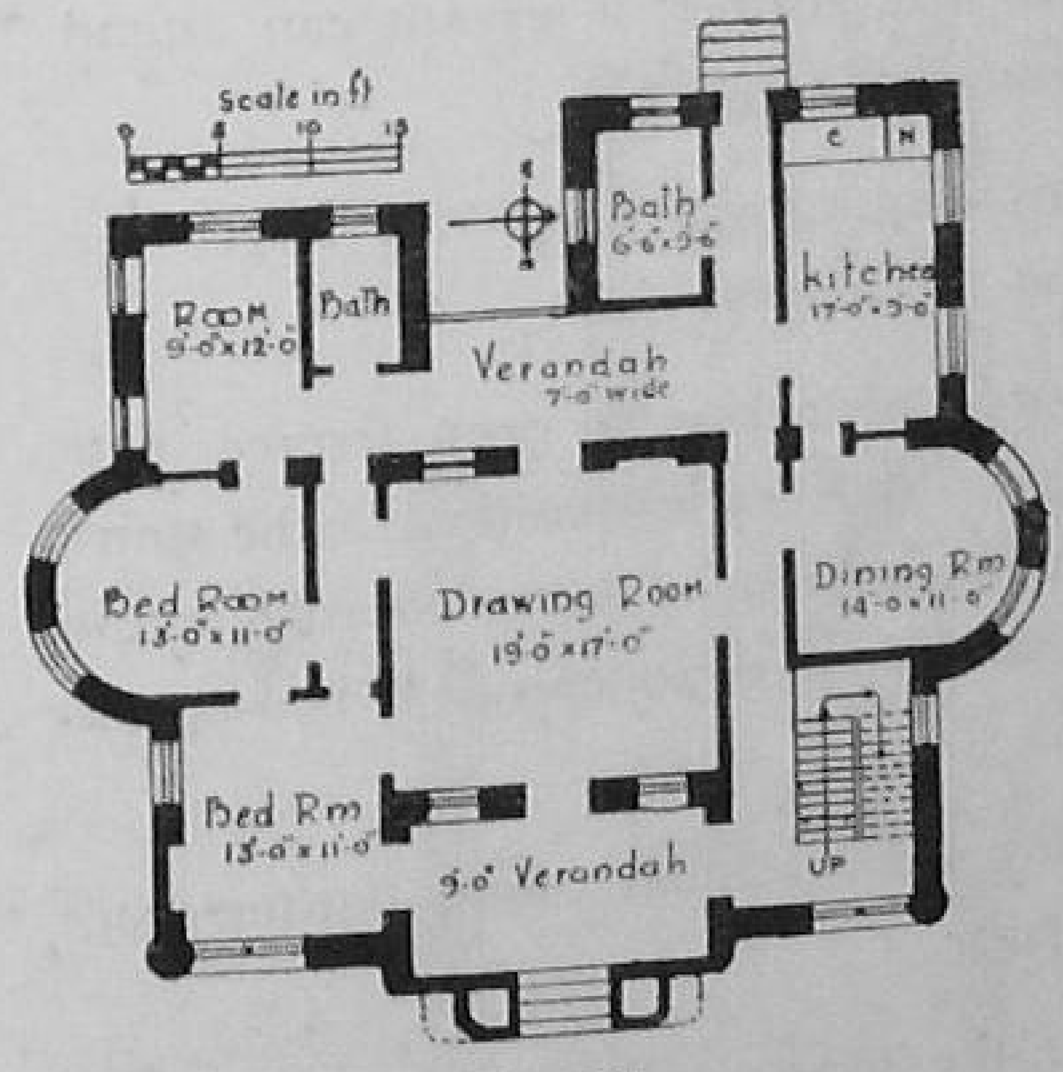


Fig. 220

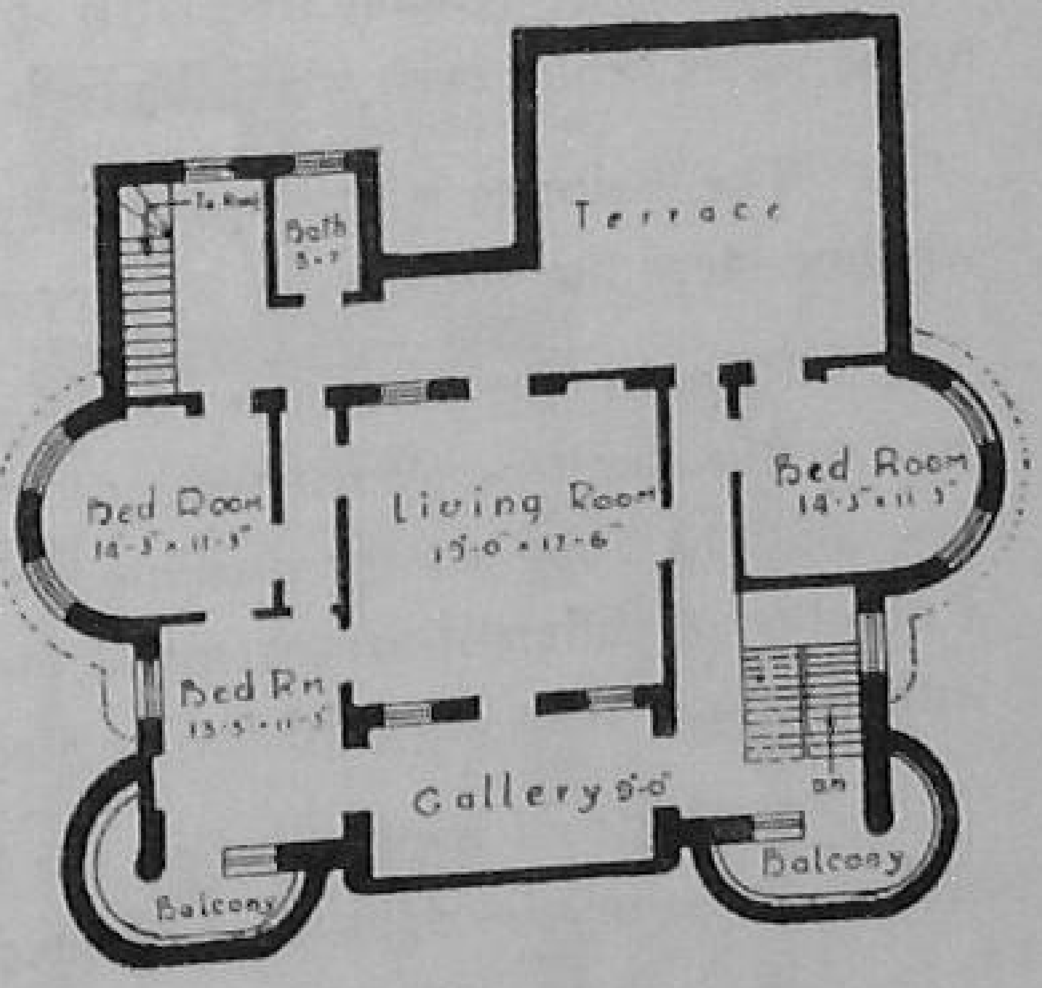


Fig. 221

Architects: Messrs. Wagle and Bhandarkar, Bombay.

PLAN NO. 82

Plinth Area of ground floor: 1,810 sq. ft.

Pre-War Cost: Rs. 14,700

This is an exquisitely beautiful cottage specially designed for comfort and convenience. There are verandahs provided both on the west and south sides where they are really necessary. Just near the entrance to the verandah on the west side there is the central passage. This passage leads to the staircase situated in the centre of the building, and goes straight to provide a back entrance. On one side of it is a kitchen of just the necessary size, with a number of built-in cup-boards, placed in the N.-E. corner, which is most suitable for a kitchen, so that the smoke and smells would pass away from the home and, further, the morning sun would purify the air, and in the afternoons and evenings it would remain cool. The store-room is just in front of the kitchen. The ladies' room has been given the proper place close to the kitchen. The guest-room is in the front and quite independent of the remaining house. Both the drawing- and dining-rooms are of adequate size and the cloth curtain between them would allow them to be converted into a large hall on special occasions. The bath and w. c. are on the back side as separate appurtenances. Water for bath is heated in a separate room attached to the bath, where it is brought by a pipe. This is a very good arrangement as the bath-room would remain free from smoke and, further, a servant can attend to the water heater even when the bath-room is engaged.

The staircase is artistically designed and, as its "well" is large, the winding steps are sufficiently wide even at the narrow end.

Upstairs, the verandah on the west is treated as an open terrace, and that on the south is covered with a flat roof. The central position of the staircase and the long passage dividing the house in front of it, very easily admit a number of different arrangements, so that four large independent bed-rooms with separate baths attached can be made.

A tiled roof is provided on the left-hand side rooms and a flat-terraced roof on those on the right-hand of the passage.

Thus, considered from every aspect, the home combines beauty, comfort and conveniences demanded by an upper middle-class family living in style.

Fig. 222

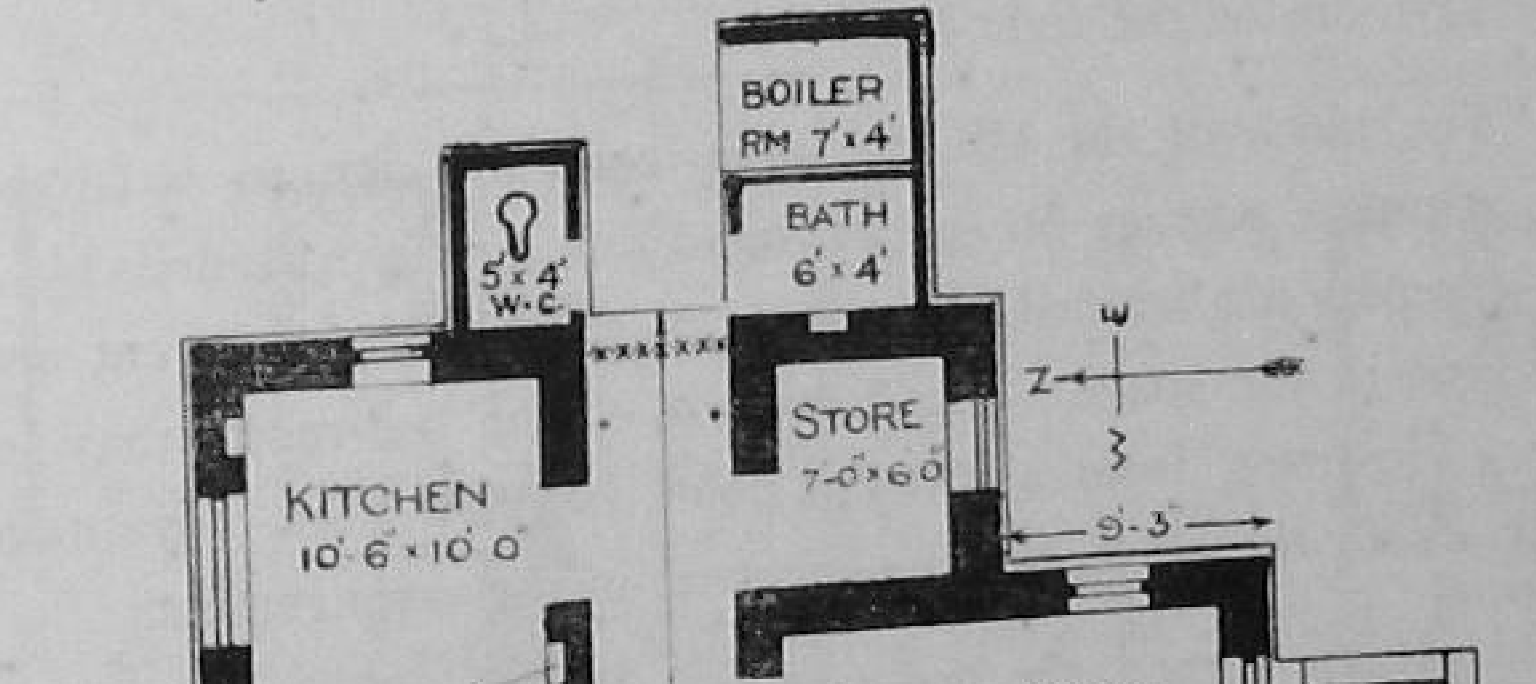


Fig. 223

Architects: M/S. Kamtekar and Bhivandikar, Bombay.
Contractor: Mr. M. G. Karmarkar, Poona.

PLAN NO. 83

Floor Area of both floors of the main building: 7,350 sq. ft.

Pre-War Cost: Rs. 32,250

THE plan pictured on page 279 is suitable either for a family of a richer class or, by suitable slight alterations, the building can be converted into two flats *de luxe,* one on each floor. The quite independent entrance to the staircase in the front easily admits of this.

While designing the house, attention is not given so much to the economy of space as to the conveniences, particularly in respect of circulation.

The main entrance is on the front, and on one side of it is a spacious staircase and on the other a large artistic drawing-hall with its front of three quarters of a circle. The long passage behind the staircase divides the house into two wings; one a service wing consisting of two garages, store, kitchen, dining-room with a pantry and servery attached on the rear and an artistic verandah in the front, and the other, which may be called the wing of rest and recreation, consisting of two bed-rooms with separate baths attached and a drawing-room on the right-hand side.

The block of the kitchen, store-room and garages is further separated by the entrance passage on the left-hand side, and is screened by a trellis on which creepers are trained. A corner of each bed-room is cut and a balcony is provided in the space. The large size of the bed-room may easily admit of this. However, from a rational point of view, the advantage gained is scarcely worth the extra expense incurred in the arrangements.

Upstairs, three large bed-rooms, each with an independent dressing- and bath-room are provided. The bed-room on the top of the dressing-room is more spacious and has a large dressing- and bath-room on its rear and a spacious verandah on the front. The other bed-rooms have a balcony in a corner just similar to the one on the ground floor. The room on the top of the drawing-room may be treated as a common sitting-room.

If the building is to be converted into two independent flats, there are already two motor garages, and what is required is to raise the kitchen and store block and provide the same arrangement of the dining-room with its pantry, servery, etc., on the upper floor, instead of a bed-room. A spiral staircase for servants, just in front of the kitchen would further add to the conveniences.

The building would suit a north or N.-E. aspect.

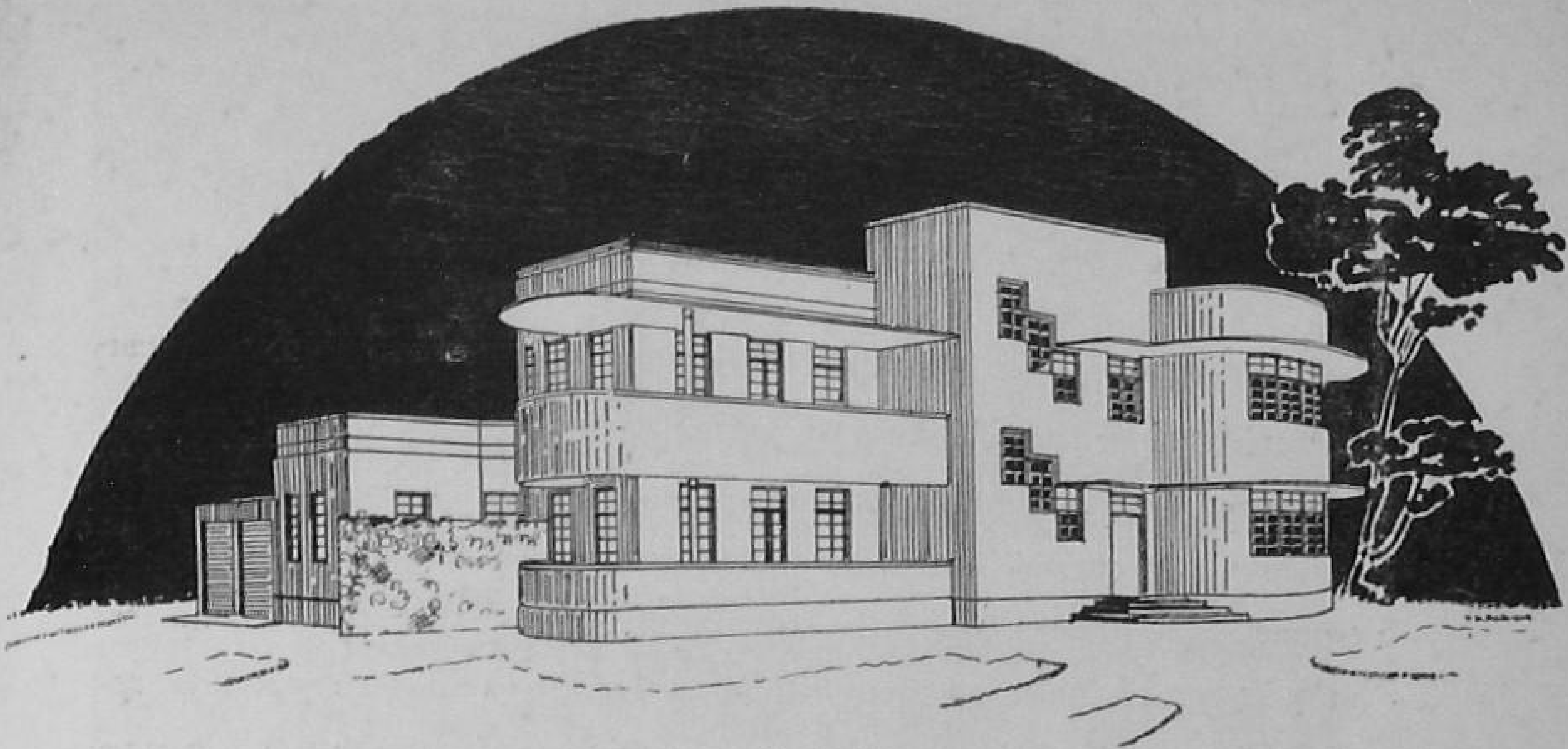


Fig. 224

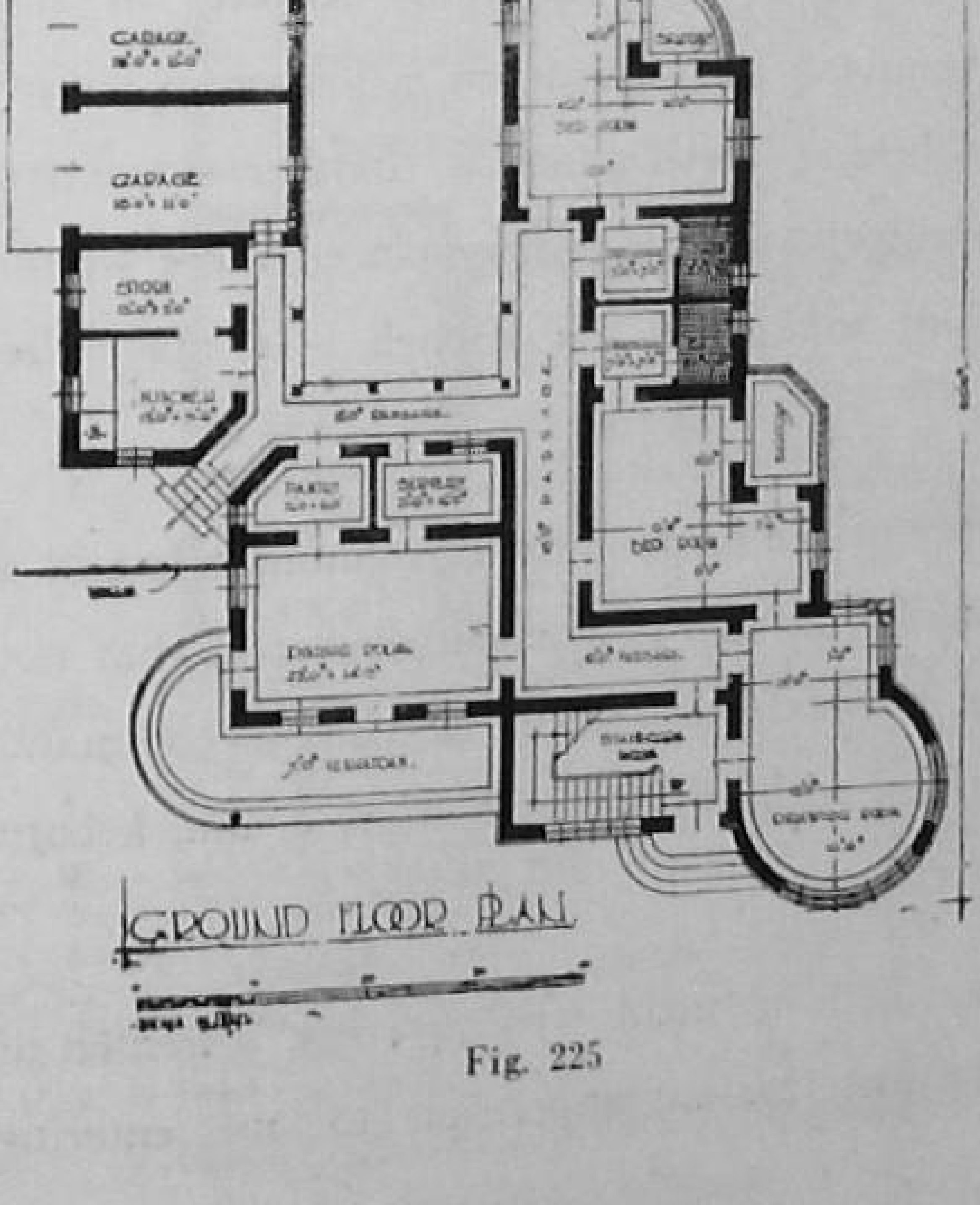


Fig. 225

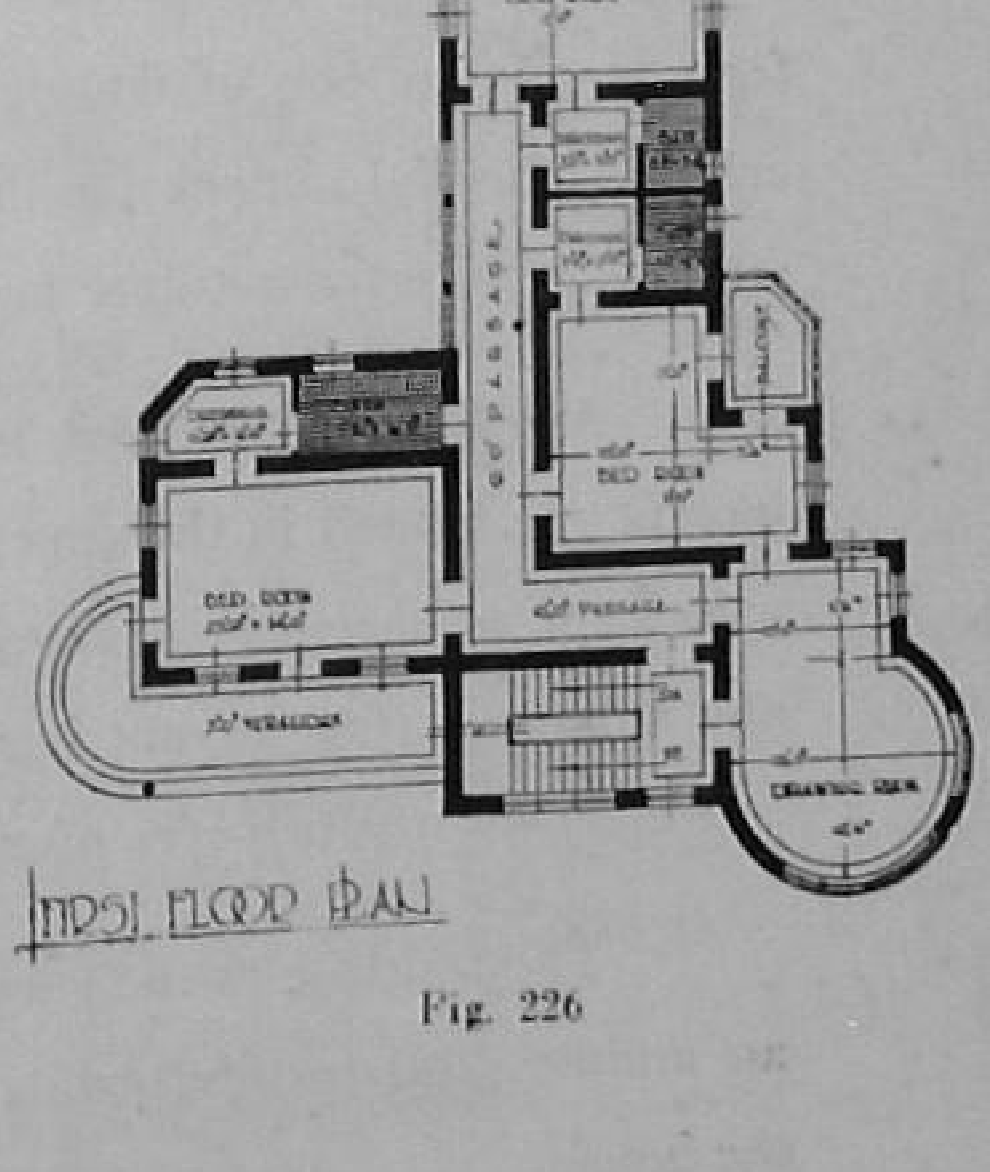


Fig. 226

PLAN NO. 84

Plinth Area of ground floor: 2,340 sq. ft.

Pre-War Cost: Rs. 21,650

FIGS. 227, 228 show the elevation and ground-floor plan of a very convenient house specially designed to suit both the Indian and European manner of living. The main entrance is on the east, in the centre of the building. On one side of it is the study-room, and on the other, library, both symmetrically situated. Both these rooms, particularly the study room, are in quiet corners, practically cut off from the hubbub and clatter of the rest of the house. There is the sanitary unit, consisting of a bath-tub, lavatory basin, a commode in the bath-room and shower-bath, the latter in a separate cubicle. This unit is very conveniently placed so that it is independently and easily accessible from any room. The 14′ × 9′ oblong kitchen is spacious enough and has also an outside entrance from the paved yard. The pantry is conveniently situated between the kitchen and dining-room. The latter is a commodious room abutting against a verandah on two sides. The L-shaped verandah 10 ft. wide, is one of the most enjoyable features of the house. It might serve as a work verandah for the kitchen, a lounge, a ladies' sitting-room, etc. The paved yard behind the kitchen is another attractive feature. A few pots of flowers or conservatory or fernery placed there would create a cheerful outlook for the lady working in the kitchen. It may also serve as a place for out-door meals.

Another commendable feature of the house is that an automobile and a servant are housed in the same building at very convenient places, so that not only is the arrangement economical, but both these would be ready at command any moment. The servant is provided with an independent w. c. and a bath —a necessity which is very often over-looked.

The staircase at the entrance, with its broad, winding steps, is treated as an architectural feature, giving the first pleasant impression to one entering the house.

Fig. 227

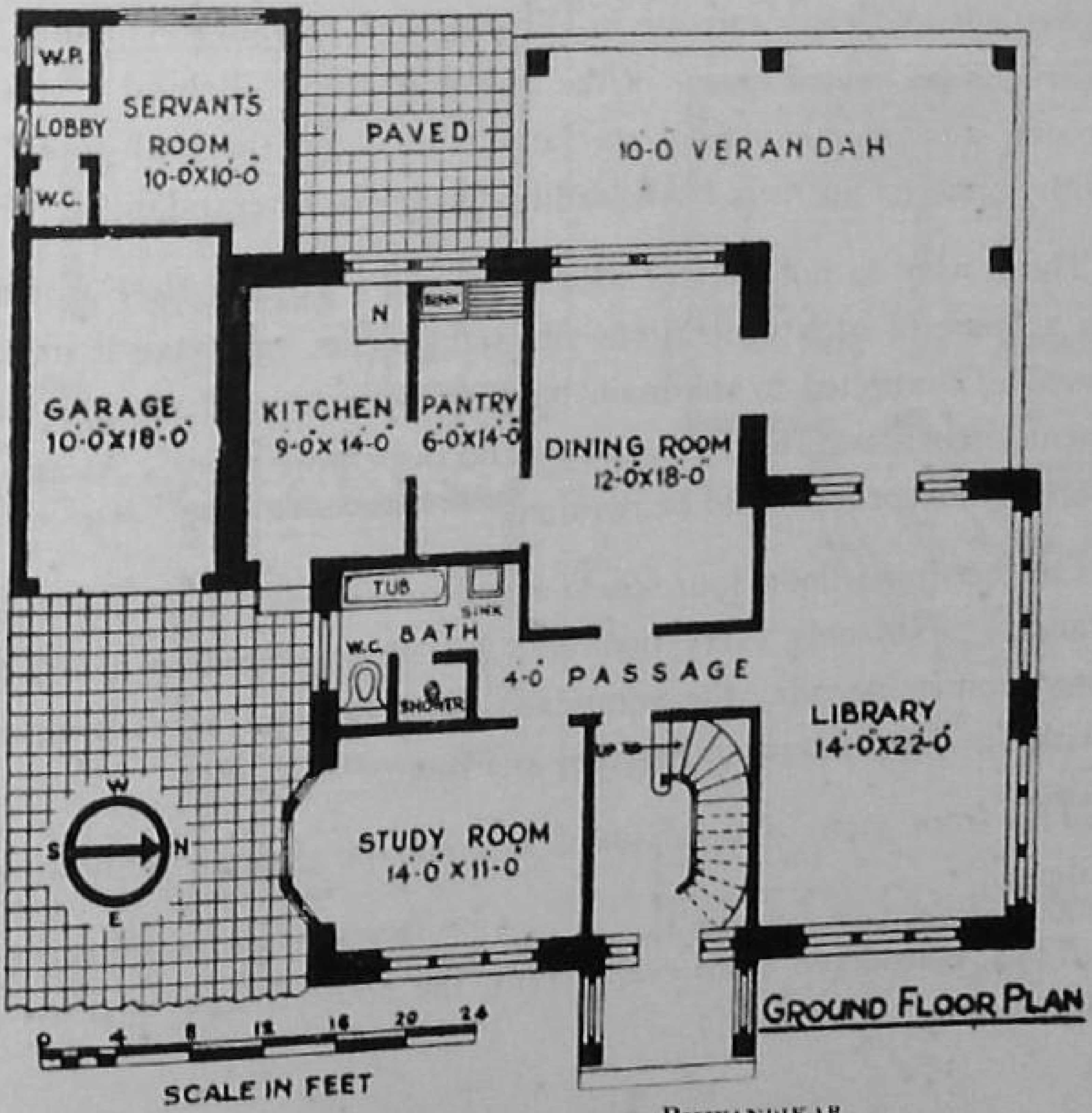


Fig. 228

Architects: KAMTEKAR AND BHIVANDIKAR.
Contractor: MR. DASTUR.

PLAN NO. 85

Area of both floors: 4,520 sq. ft.

Pre-War Cost: Rs. 20,400

THE plan represented by Figs. 229-231 is of one of the most beautiful villas suitable for a large family belonging to a richer class, living either in Indian or European style. It is also one of the most economical designs in which every inch of space is utilised to the best advantage.

One enters the quarter-circular front verandah by ascending a flight of steps, on both sides of which concrete flower-boxes are provided. On either side of the verandah are placed two large rooms, symmetrically situated with respect to the axis across the verandah. One of them is a drawing-room, and the other is called an office room, but it may be used as either a bed-room or a "comfort room." In the latter case, a small ante-room may be formed by a partition across it on the rear side. In front of both these rooms, concrete flower-boxes are projecting in front of the large windows.

Behind the front verandah, a small staircase hall is placed with a closet in the right-hand corner for overcoats, canes, umbrellas, etc. Two w. c.s and a toilet room with a urinal are also provided behind the drawing-room. A very convenient and easy staircase in two flights is arranged in the staircase hall. This can be treated as one of the artistic features. Behind it is a spacious dining-room, and on one side of the latter are placed the bath-room, kitchen, store, with a passage in their front leading to the back verandah.

Those who do not like the idea of having a kitchen close to the dining-room in a house of such proportions and refinements, can have it in a separate block outside, connected to the main building by a covered passage, and utilise the present kitchen and store as a pantry and dispensing room. At any rate, the bath-room in the corner would be required.

On the upper floor, four spacious bed-rooms, with their own bath-rooms, are arranged. Not only every bed-room has an independent access to it, but the front promenade, viz., the verandah, could be used as a common sitting-room with an independent access from any room.

The front view is as beautiful as could be desired, without any ornamentation.

Thus, considered from every point, the house is sure to prove the pride of the occupants.

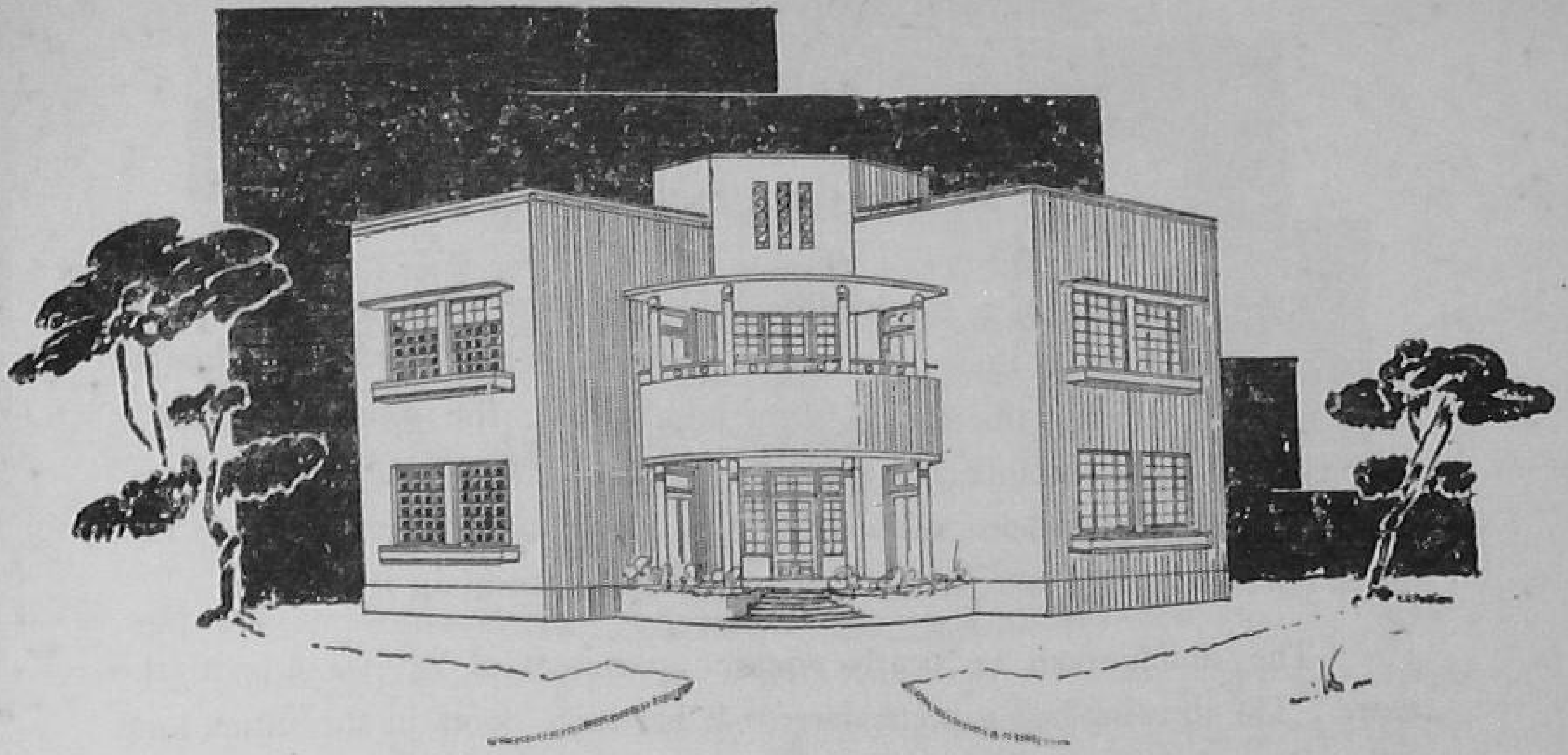


Fig. 229

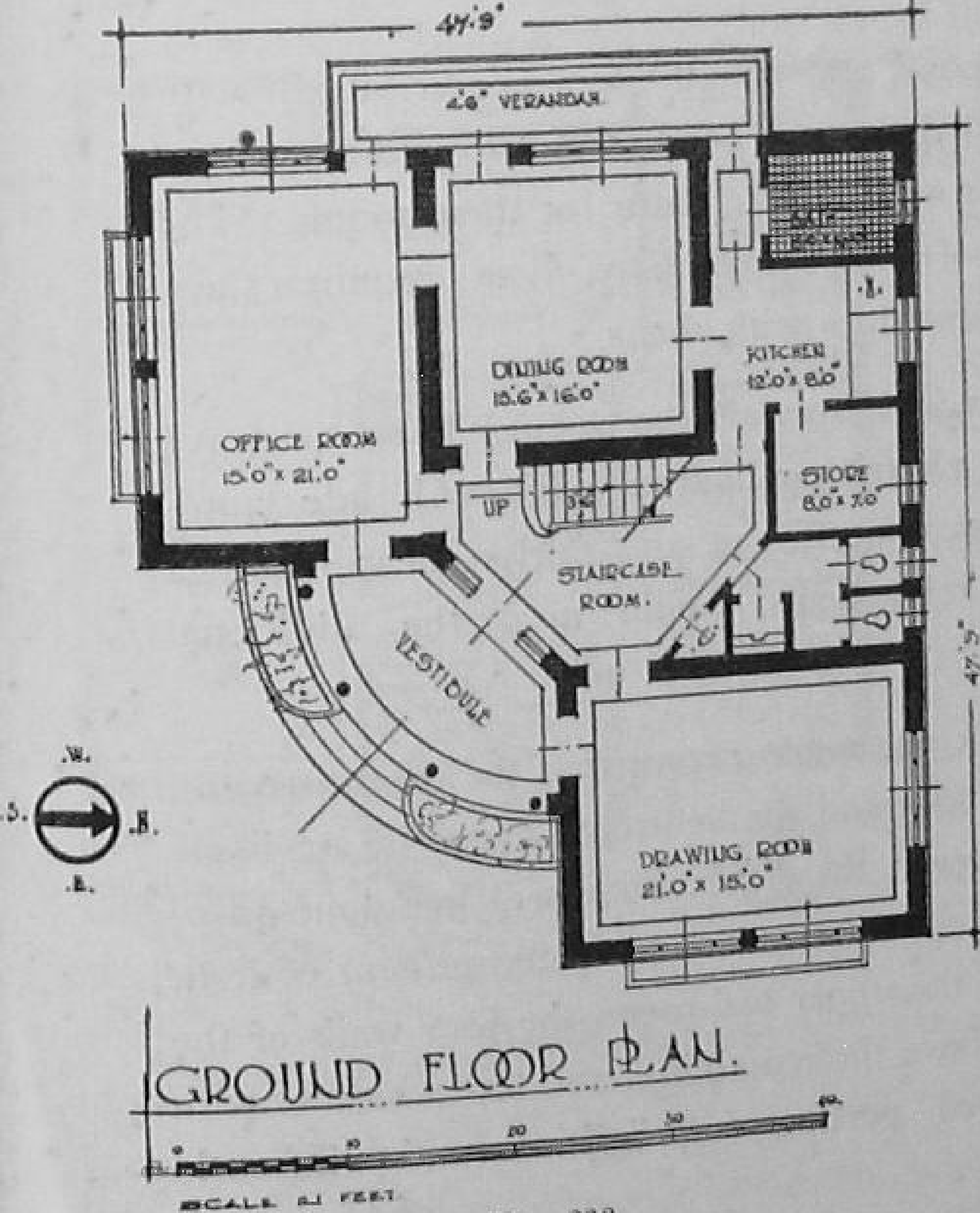


Fig. 230

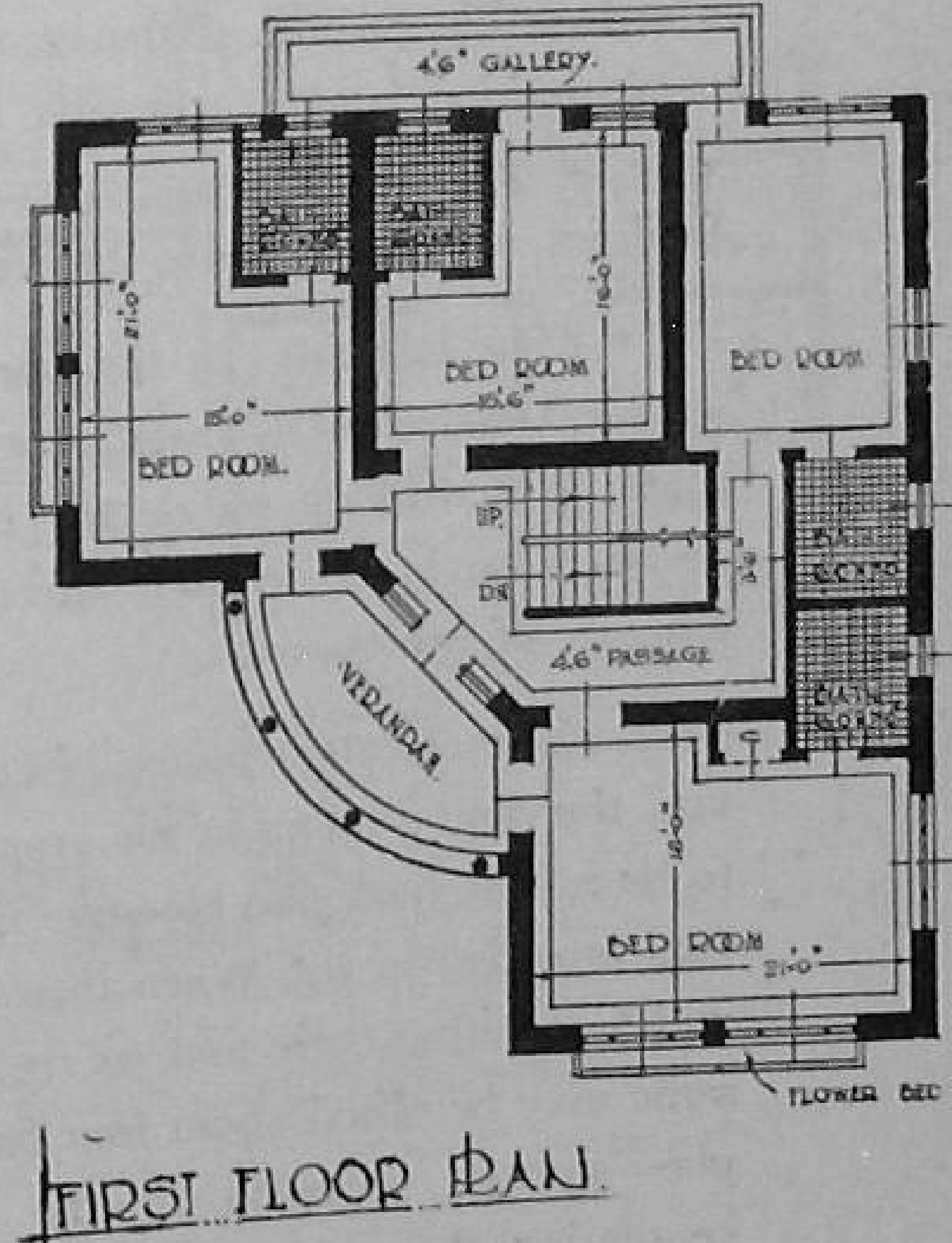


Fig. 231

PLAN NO. 86

Floor Area: 3,820 sq. ft.

Pre-War Cost: Rs. 16,370

THIS is a plan of a more artistic and luxurious building, which is designed more for comfort than for economy. There are two fronts, either of which can be treated as the main. In the present case, the southern front is treated as the main entrance and elevation is drawn from that side. However, as there is a more open and spacious verandah and a larger staircase hall on the north side, the latter would be more suitable as the main front.

The dining-room, a nearly square apartment of $14' \times 15'$ is in the centre. The drawing-hall is pretty large. It has three doors in the inner long wall. One of them could be preferably cancelled. Two many doors interfere with privacy, come in the way of furniture, and also cost a good deal. Beyond the drawing-room is a study-room. The right-hand wing is occupied by the kitchen, store, bath and a ladies' apartment, all of which are grouped together in the best possible way. A home of such niceties does require two staircases, and these, also, have been provided.

On the first floor, five bed-rooms and a bath-room are arranged, with a terrace on the top of the verandah below. The sizes of two bed-rooms are very luxurious and it is possible to provide private baths for these rooms. The class of people occupying a home of such pretentions does require these facilities, which, by habit, become necessities with them.

The staircase on the north side is specially so arranged as to leave sufficient space in its "well" for an electric or hydraulic lift. Of late, automatic lifts working on electric energy are efficient and fairly cheap, and a house of such a size and internal refinements should need the additional amenity of a lift.

The elevation is very beautiful; one might expect that the central rooms, viz., the dining-room on the ground floor and the bed-room above it, are likely to be a little dark and gloomy. However, there are as many as five door openings provided in it. When these are open there would be any amount of light and air coming there and, as regards the upper bed-room, the four walls of the same may be raised about four feet above the remaining, and low windows with glass shutters provided in the raised portion for lighting and efficiently ventilating the room.

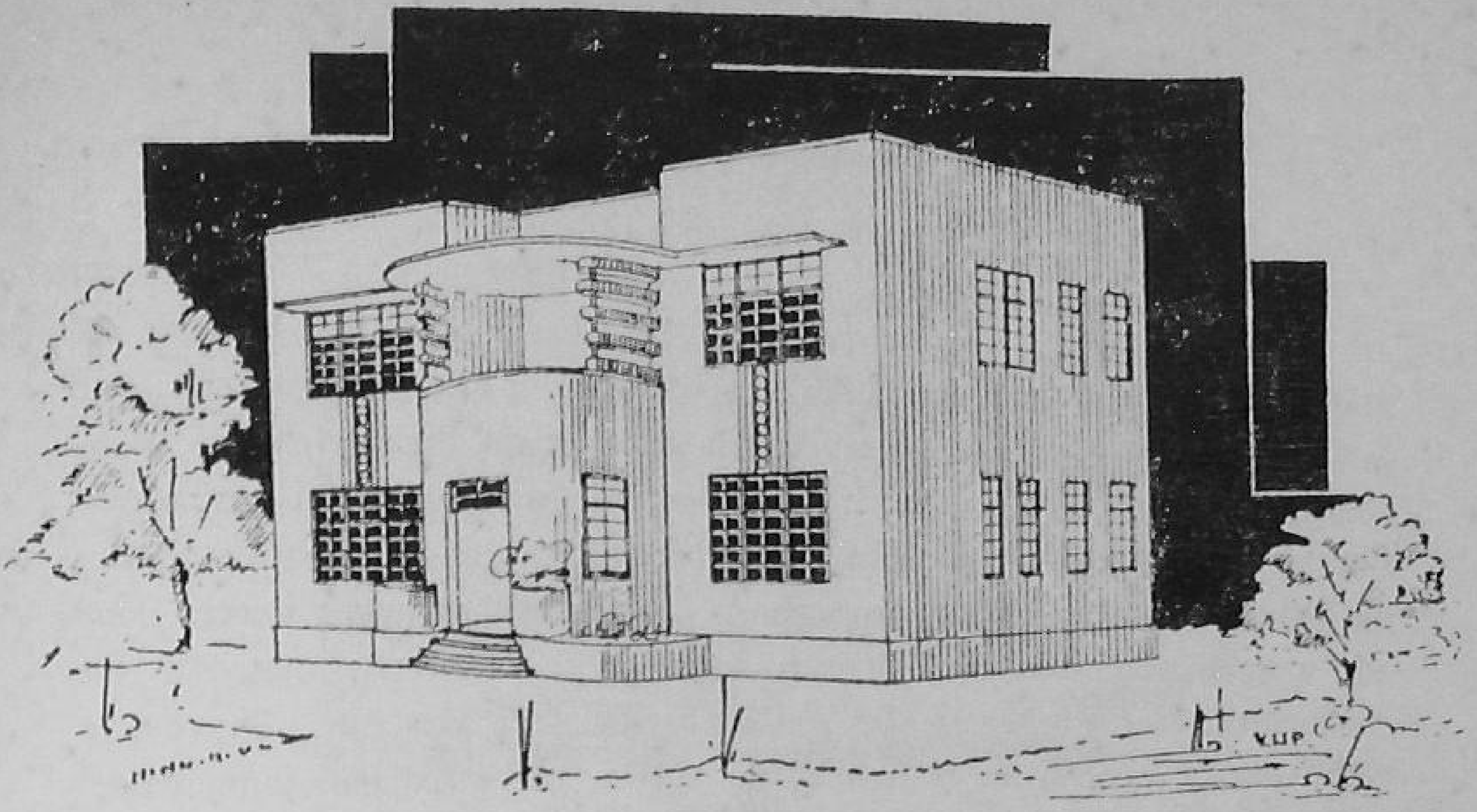


Fig. 232

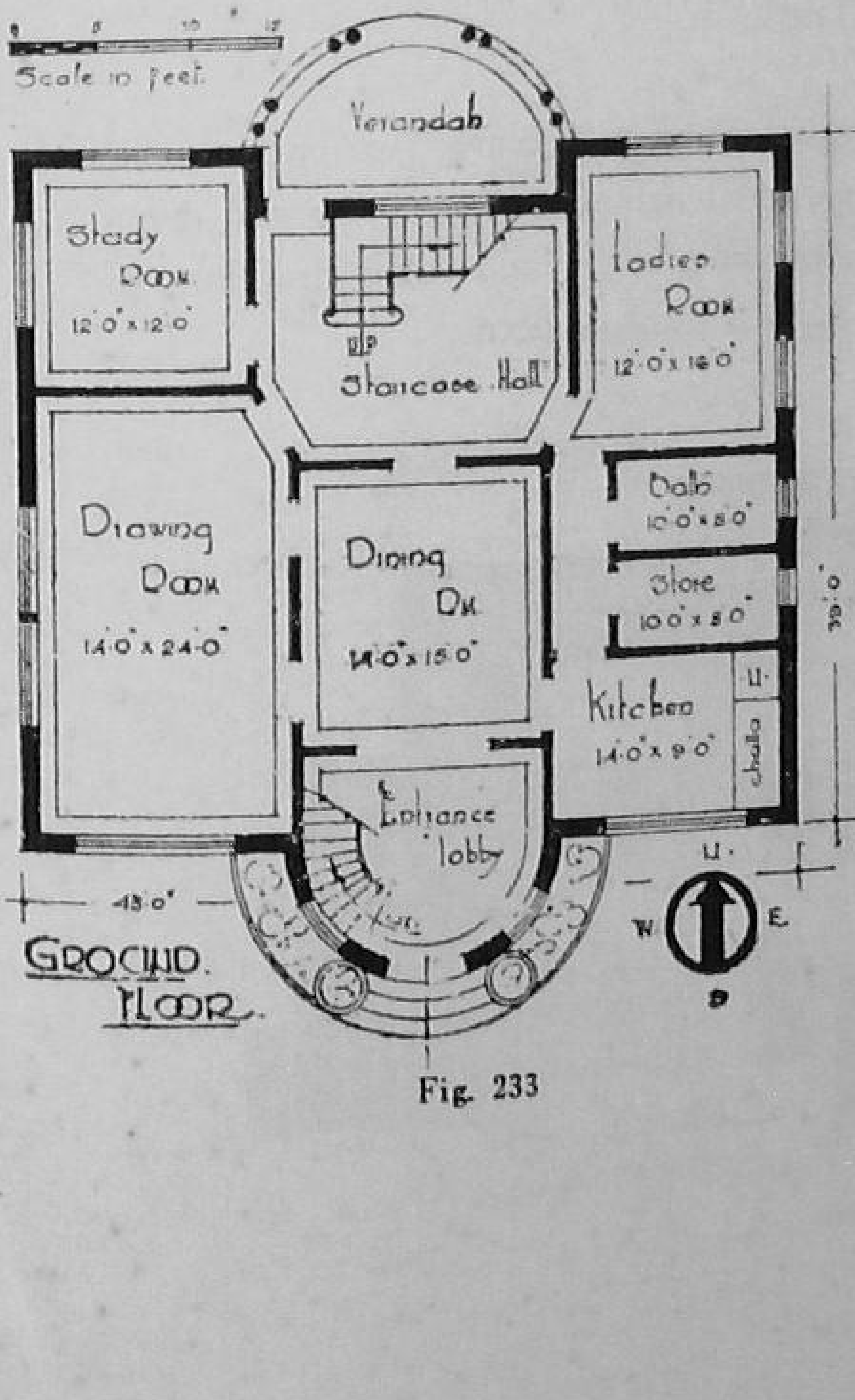


Fig. 233

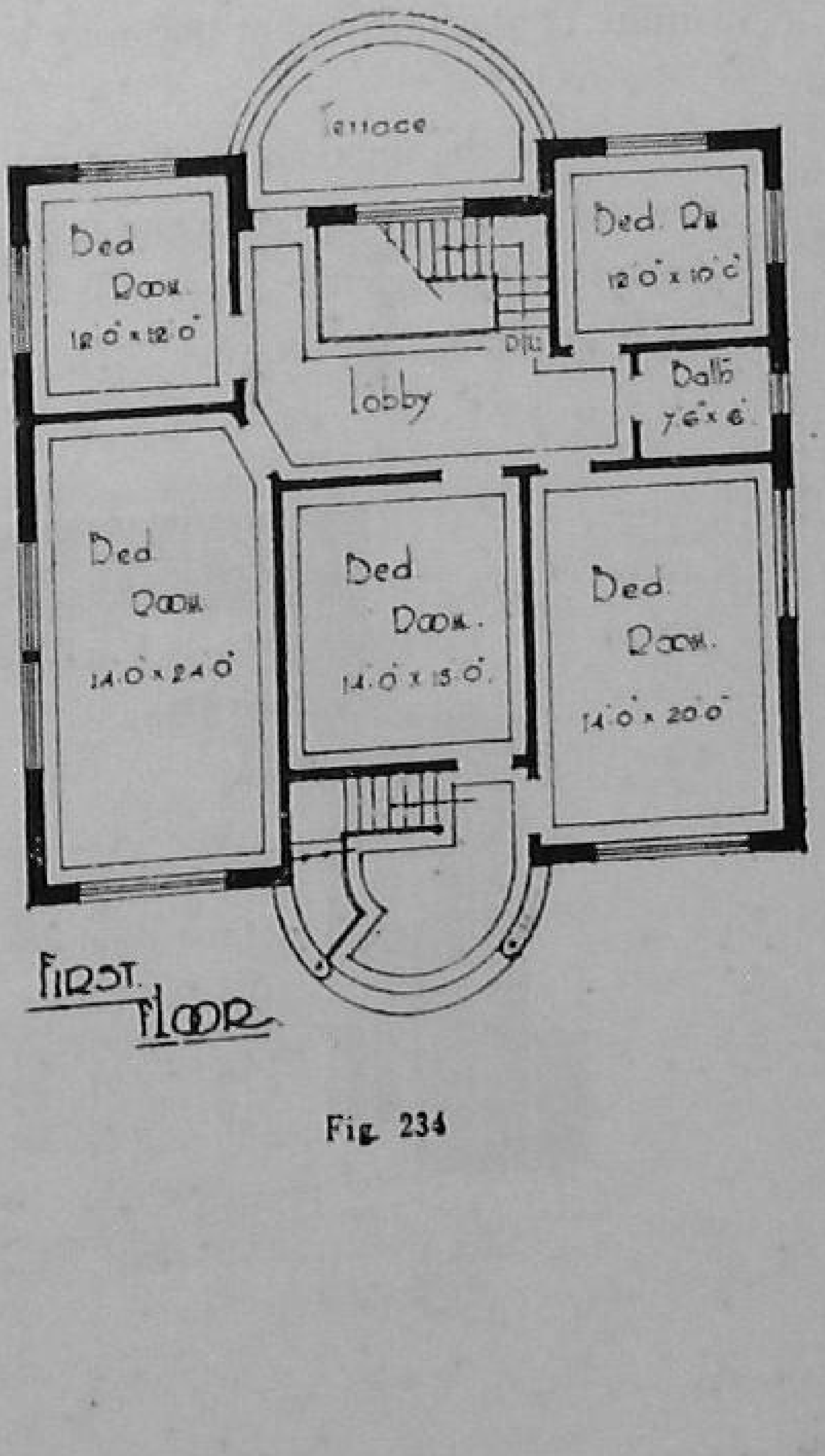


Fig. 234

PLAN NO. 87

Floor Area: 4,040 sq. ft.

Pre-War Cost: Rs. 16,500

THE home represented by the plan here has a small semi-circular entrance porch, behind which is a spacious verandah on the left-hand side, and a 7′ 6″ passage in front. A staircase, in one straight flight of stairs, is arranged in this passage, so that it is independently accessible from any room. On the right-hand side of the passage is a spacious drawing-room with a charming semi-circular bay-window projection. The size of the kitchen is very good and a small store attached to it increases its utility. As it is situated in the north-east corner, kitchen smokes and smells would be kept out. There is a bath-room for general use in front of the kitchen and a spacious dining-room is close to the kitchen. In fact, the ladies' apartment would be more suitable for dining purposes. There are two back entrances provided, one between the drawing-room and store, and the other through the ladies' apartment. There is also a third, direct from the kitchen, but it detracts much from the utility of that apartment and may be closed.

On the upper floor, there are four excellent bed-rooms, two bath-rooms, one common to two bed-rooms, and a verandah which is accessible from every bed-room through the staircase lobby. The orientation and the direction of wind are shown on the plan. The elevation is ultra-modern.

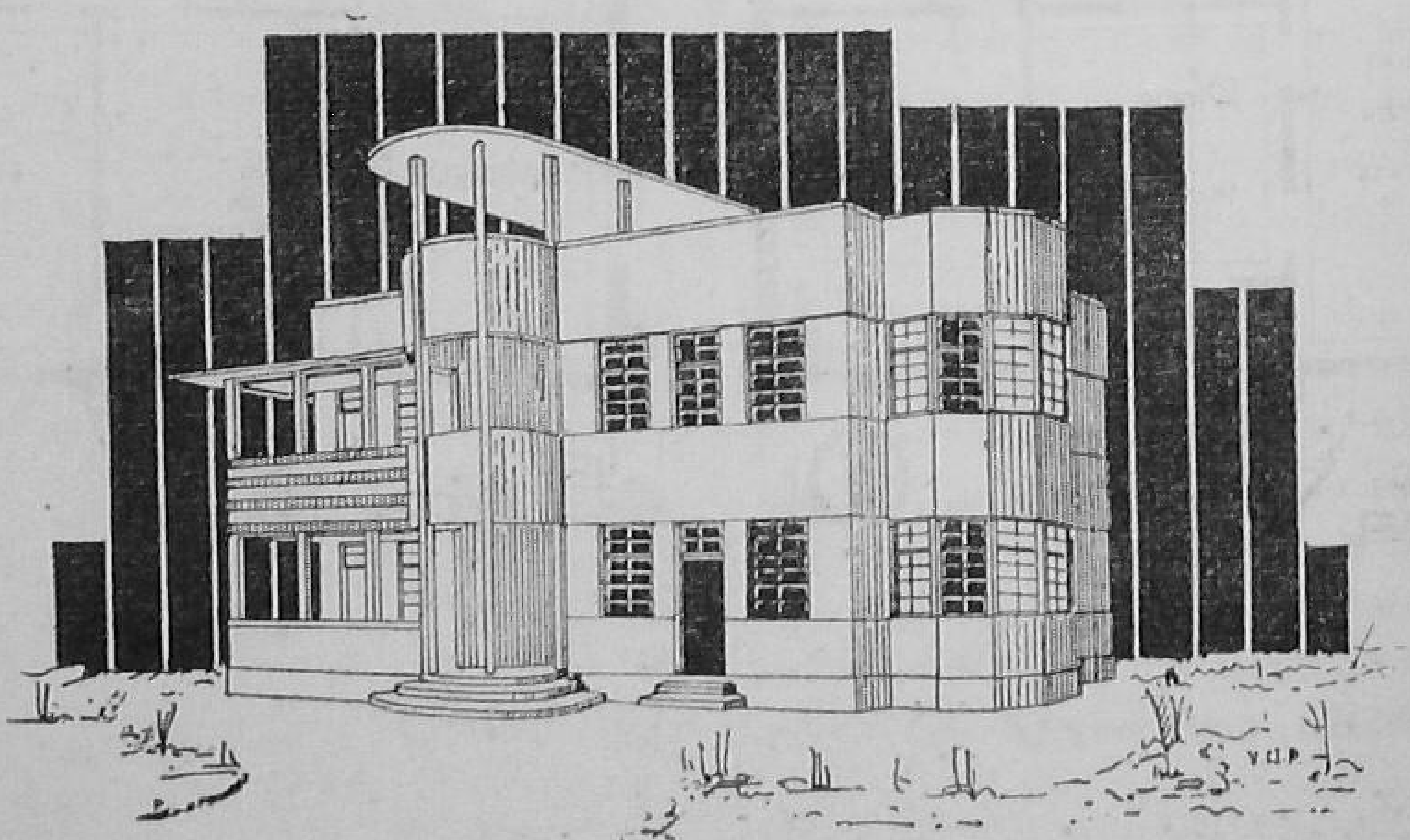


Fig. 235

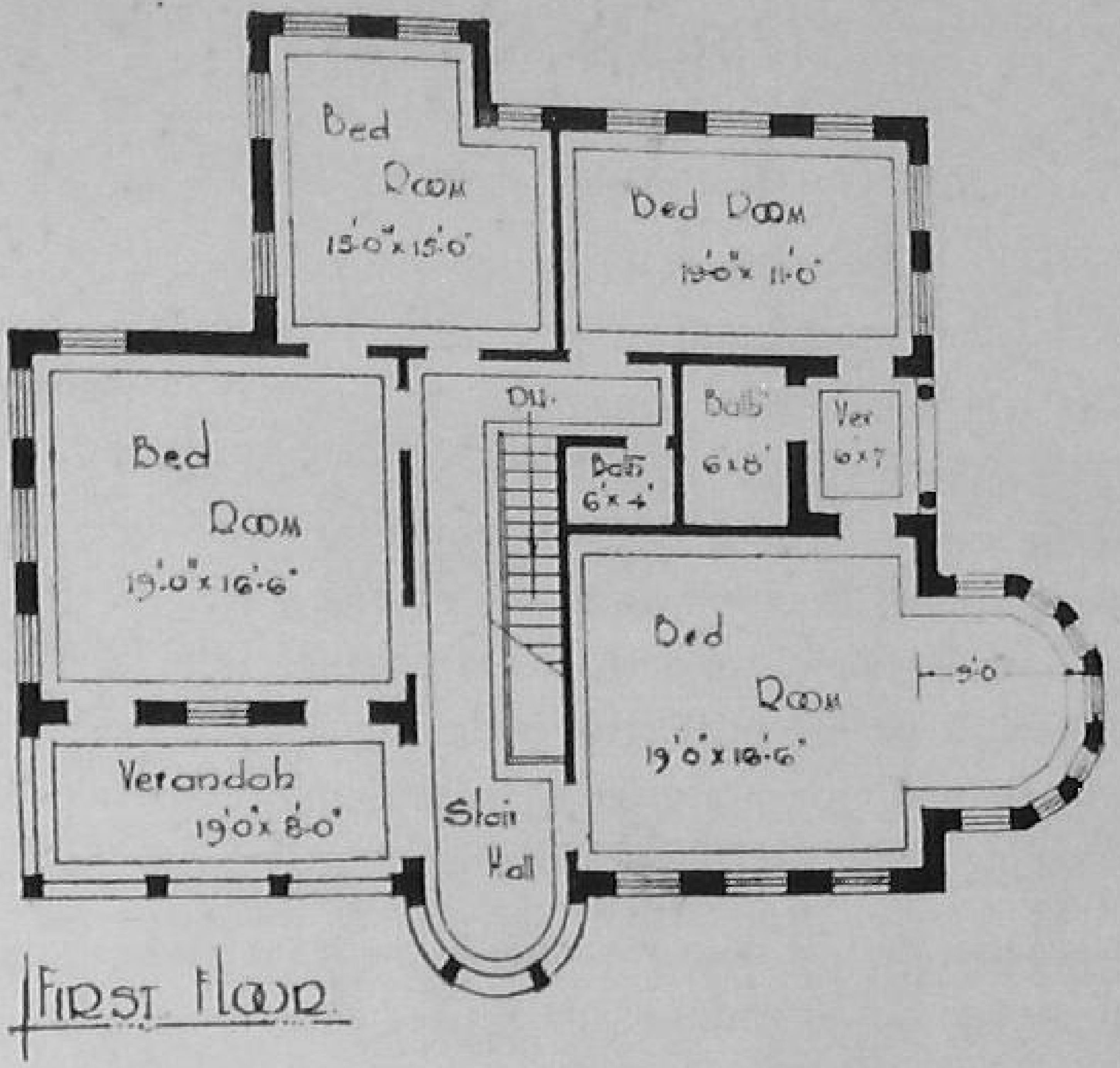


Fig. 236

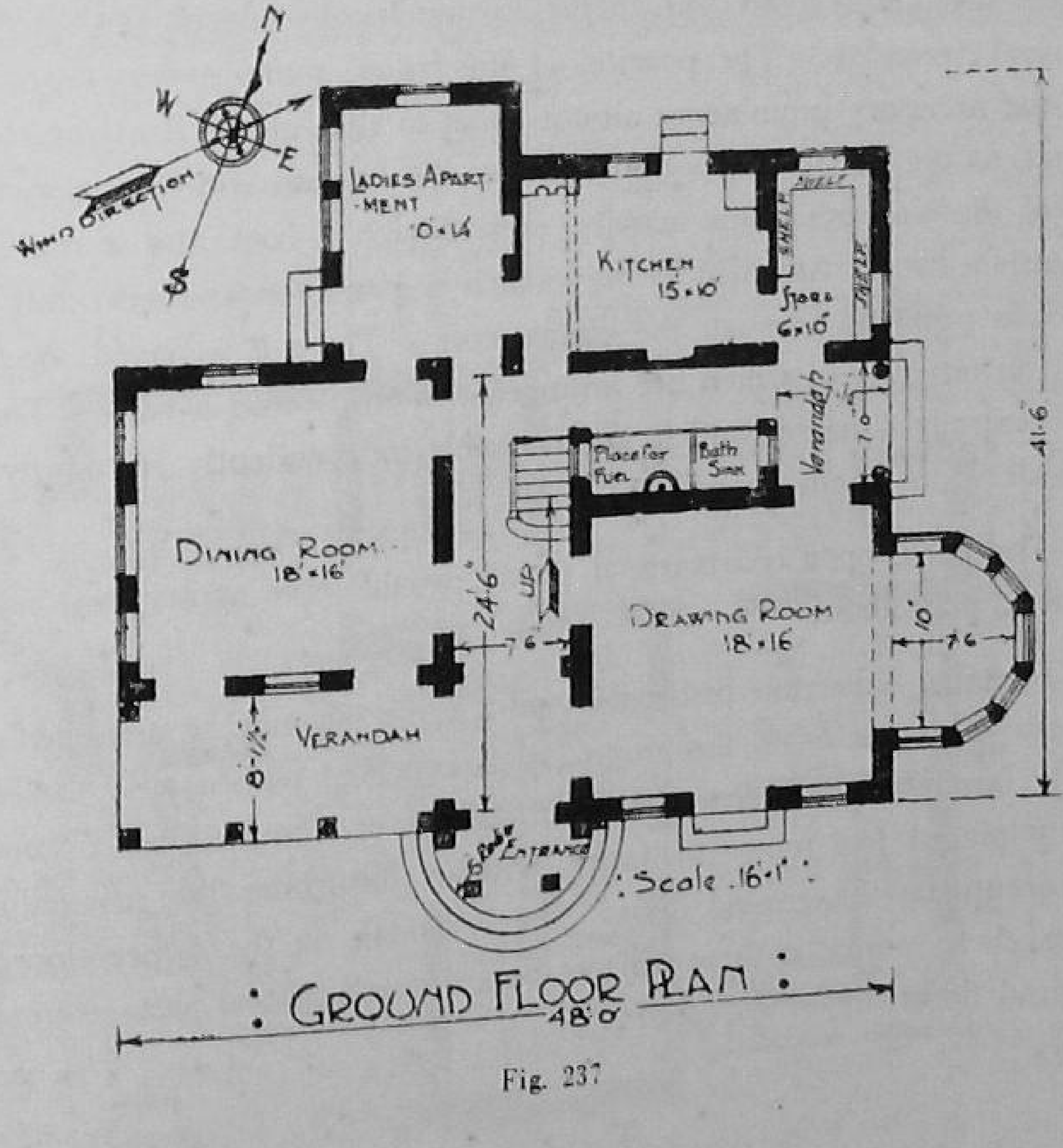


Fig. 237

PLAN NO. 88

Floor Area: 4,280 sq. ft.

Pre-War Cost: Rs. 16,750

HERE is a home which contains all the essential elements of a fine design—beauty without vain ornamentation, strength and stability firmly impressed on the exterior, and interior arrangement, sound and practical. The employment of rough-dressed stone in the exterior gives it an appearance of strength, the stream-lined, sweeping, round *chhajjah* and the wrought-iron grilled windows in the verandah, give it the simple charm of modernity and the symmetrical front gives it a grace of balance and proportion. Thus, there is a nice blending of the traditional and modern architecture in it.

The quarter-circular deep verandah in the front, though, on account of the central passage not so useful on the ground floor as on the upper one, is the central feature in the elevation. On its left-hand side is a beautiful drawing-room of ample proportions, with an attractive semi-circular bay-window, and beyond it is a bed-room open to the western breeze. Corresponding to these are the ladies' room and kitchen, symmetrically placed with respect to the central verandah. The position of the ladies' room is very appropriate. It has the necessary prominence almost equal to that of the drawing-room for men and, at the same time, is quite close to the kitchen and dining-room—the centre of the woman's home activity, even though a cook and a maid might be in employment. Attached to the kitchen is a small store-room, and a back entrance is provided through the dining-room. There is a paved, open yard behind, on one side of which are arranged two w. c.s and a bath. The staircase is centrally situated, and is approachable independently from any room. It is made wider at the entrance.

The back, open courtyard, if paved, would serve as an ideal room for children to play about.

Upstairs, either five bed-rooms and a verandah may be arranged, or the same suite of rooms as on the ground floor, repeated with a view to letting it out to a family as an independent flat. However, the staircase is not conveniently placed for doing the latter, without disturbing the privacy of the family occupying the ground floor. The verandah on the upper floor would be an excellent lounge as there will not be a through central passage in it as on the ground floor.

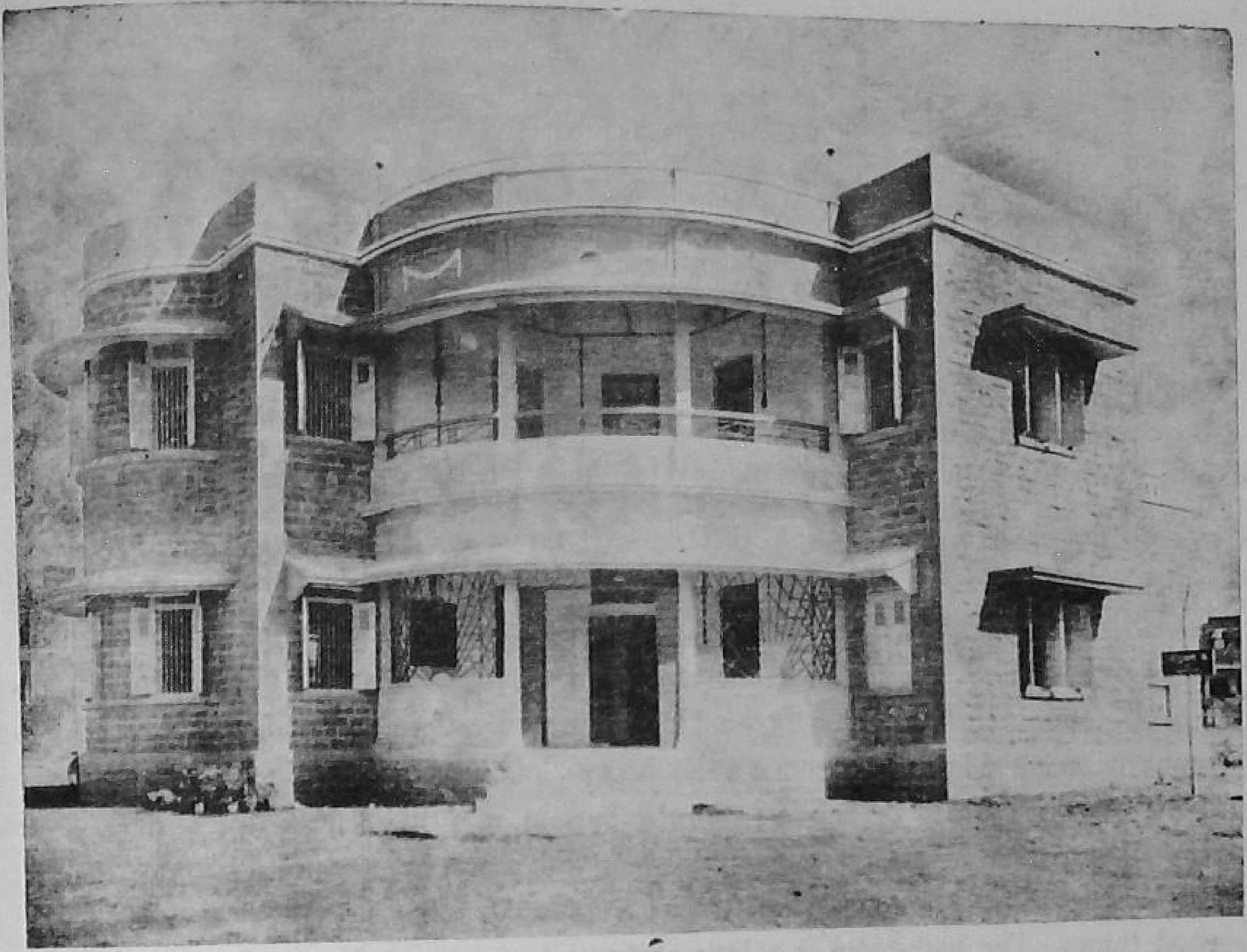


Fig. 238

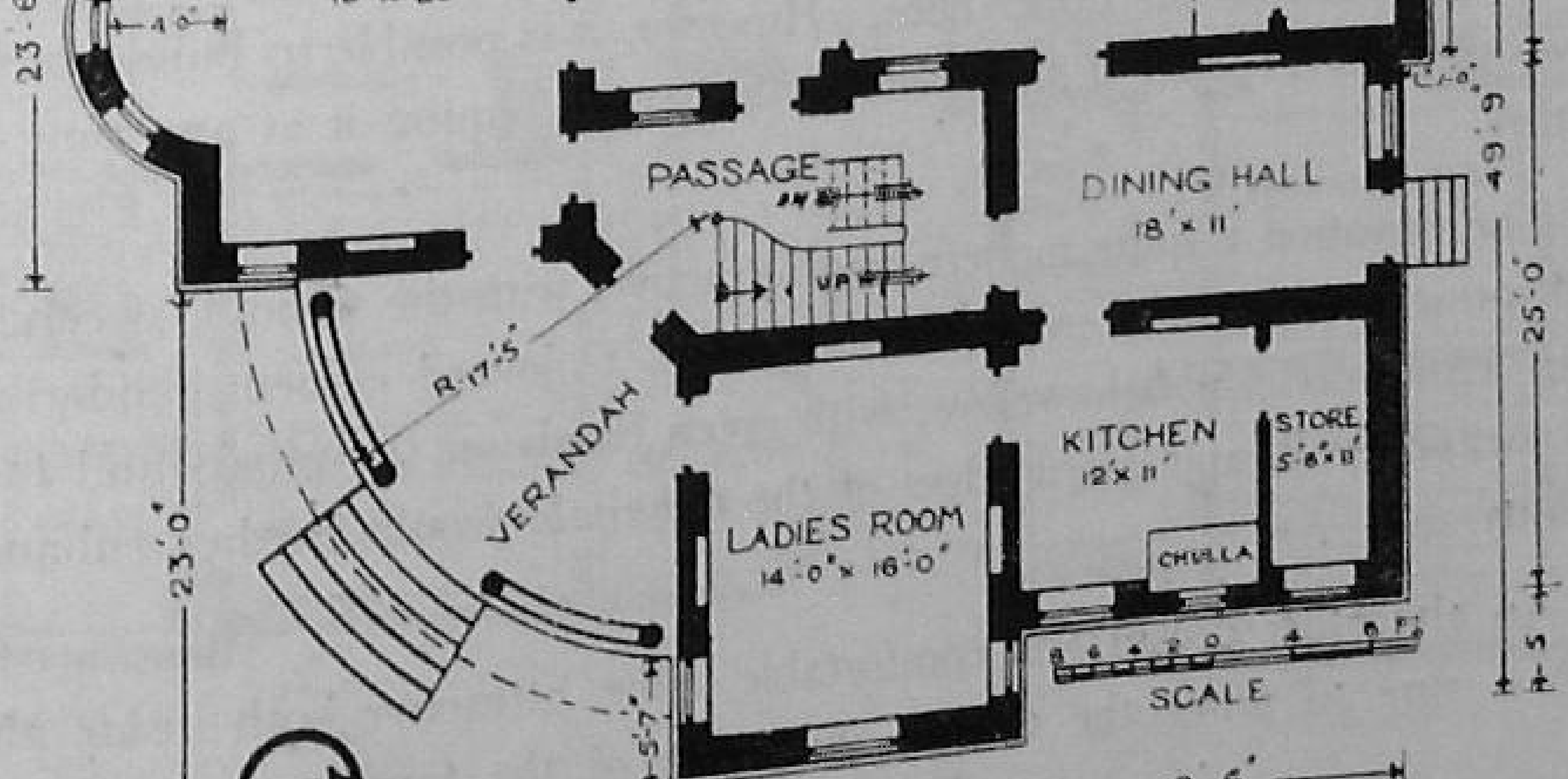


Fig. 239

PLAN NO. 89

Floor Area: 4,441 sq. ft.

Pre-War Cost: Rs. 18,100

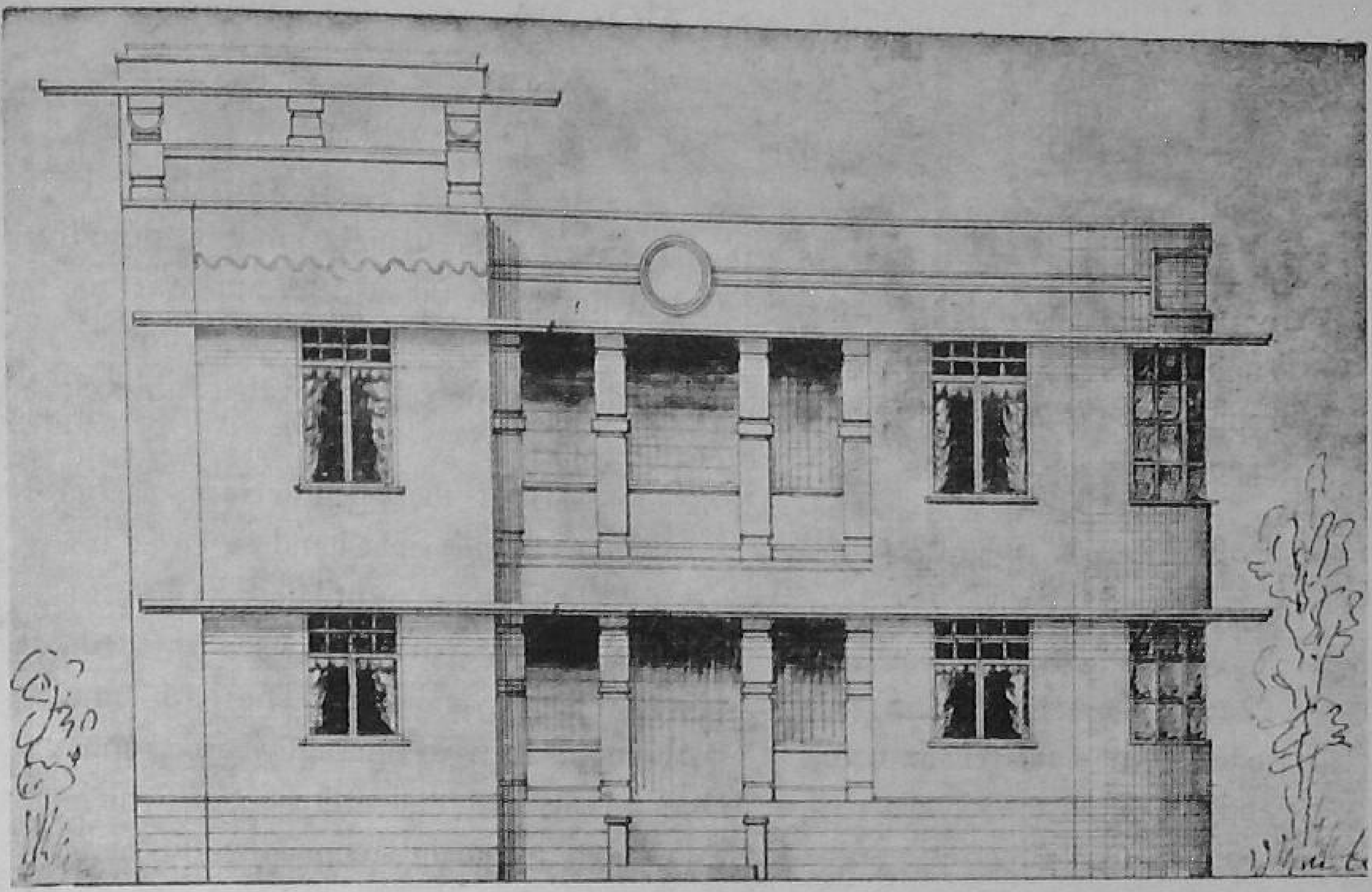
THIS is a very practical and pleasant home designed solely for comfort. Graceful lines, restrained ornamentation, and perfect domesticity are some of the characteristics of it. It is suitable for a corner plot, the main face, with the 8 ft. verandah in front, abutting against the highway on the west side, and the other face abutting against the by-way on the south side.

The main entrance is into the front verandah, on the left-hand side of which is a day nursery for children, and on the right-hand side, an office room. Behind the verandah is a spacious drawing-room. This room, amongst middle-class families, is the family's show-room and, as such, it commands an excellent position in this home because, excepting the dining-room, it is surrounded on all sides by either a verandah or a lobby. Behind the drawing-room, and joined to it by only a removable curtain, is a dining-room of equal size. The pantry is very conveniently situated with respect to the dining-room. The kitchen and store-room are detached by a small lobby which is a very good thing. The bath-room is a little removed from the kitchen and dining apartments, which some families may not like. In that case the room "W. P." (washing-place) may be converted into a small, special bath-room near the kitchen, and the washing-place provided outside. The staircase has found a convenient location in a lobby, so that it is easily accessible from any room. The bed-room behind the staircase is, in fact, the ladies' apartment. Behind it is a back entrance, which is very convenient for calling in hawkers selling vegetables, etc.

Four bed-rooms and verandahs in front and rear and two bath-rooms have been provided on the upper floor. However, it is possible to build one or even two more bed-rooms, if the needs of the family require it at any time in the future.

The elevation is quite modern and attractive, with the smooth, sweeping lines of projecting *chhajjah* on both the faces. Coloured cement rendering, either in a snowcrete or light yellow, with green bands on the pillars and face of the parapet wall, and green edges of the *chhajjah*, would further enhance the beauty.

An altogether decent and comfortable home, attractive both inside and outside, is sure to prove the delight and pride of the family occupying it.



— FRONT ELEVATION —

Fig. 240

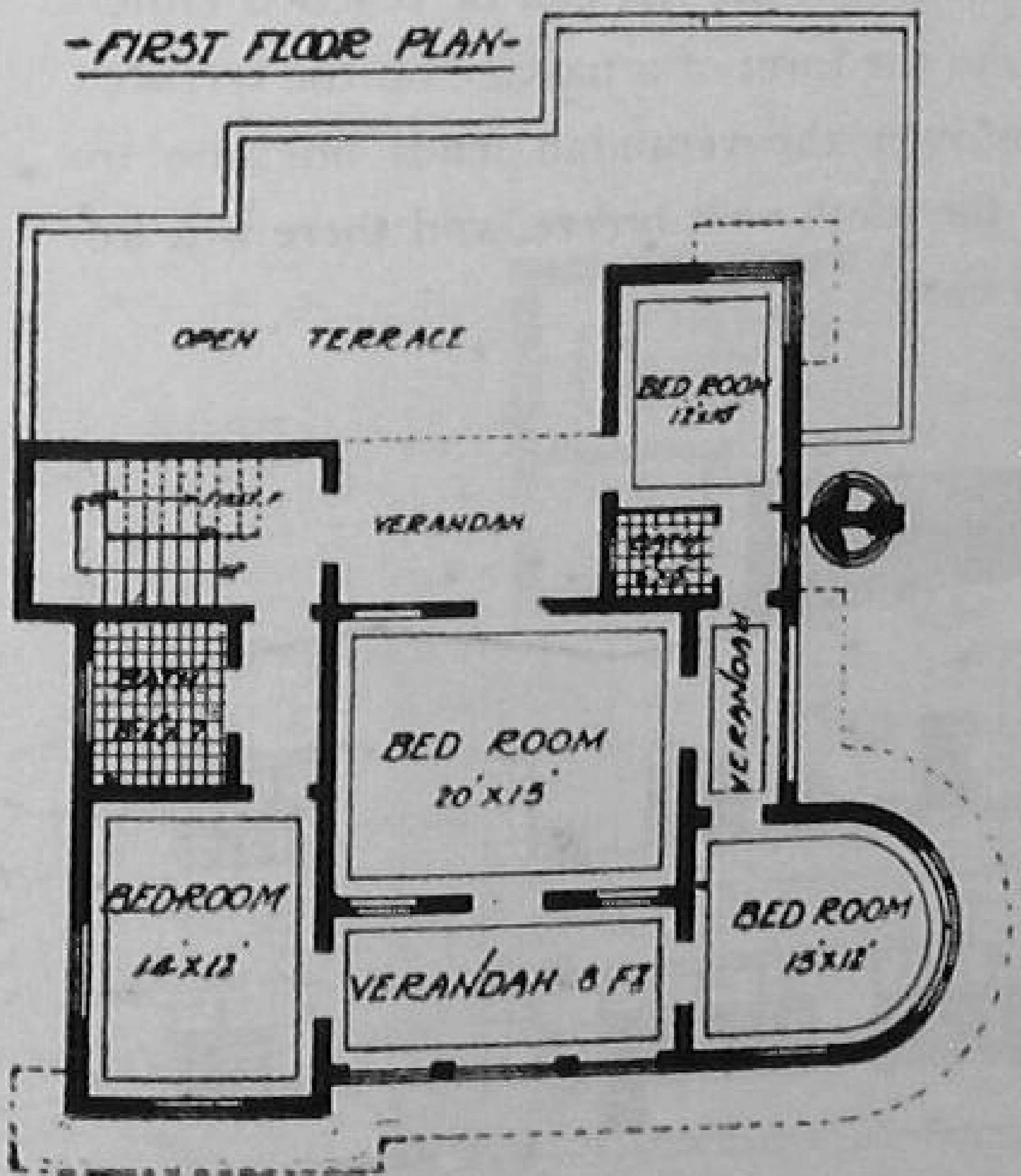


Fig. 241

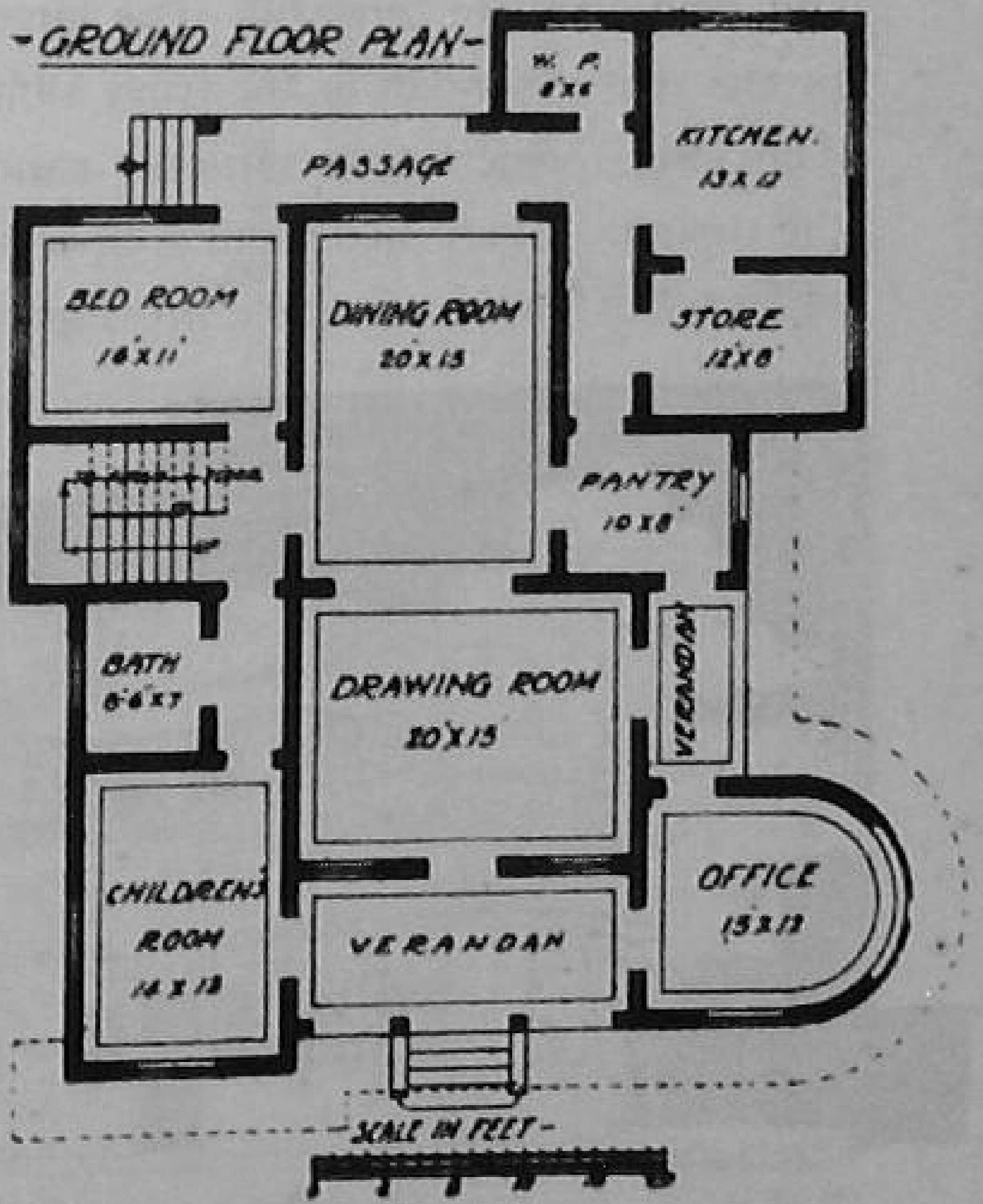


Fig. 242

PLAN NO. 90

Floor Area: 4,311 sq. ft.

Pre-War Cost: Rs. 19,450

IN PLANNING this home, utility and beauty were considered together. It possesses such a charm and distinction that even princes might envy its proud possessor. The home is, in fact, one room thick, but the wide frontage it occupies gives it an appearance of a mansion. The wide, open terrace running round three sides, the sweeping lines and the projecting, long, oval, cantilever canopy upstairs are some of the distinctive features.

The entrance is in the right-hand corner of the open terrace. The latter is protected by a projecting *chhajjah.* On the right-hand is a day-nursery for children, a large room very well lighted and ventilated. Close to it is the ladies' apartment from which the children's activities can be watched. Beyond it are the kitchen, store-room and a small verandah. The bath and toilet are in a convenient corner. The dining-room is an unusually large room and is close to the kitchen. Close to it is a gents' informal sitting-room, which could be used either as an occasional bed-room, a smoking-room, a study, or a seclusion room. There is an excellent sized drawing-room in which the furniture, including a grand piano, is shown. There is a long, fixed seat along one side. On the rear side of these three rooms is a spacious verandah ten feet wide, in which, at one end, is placed the staircase.

Four bed-rooms are arranged on the upper floor. The one for the master is very large and luxurious. There are two bath-rooms, one at each end, and also two terraces. The large terrace on the left can be reached either by the rear verandah or the front lobby, in the form of a passage on the terrace. The long, projecting, cantilever canopy over the verandah lends boldness to the design. Every bed-room is open to the south-west breeze, and there is a lot of closet or cupboard space provided in each.

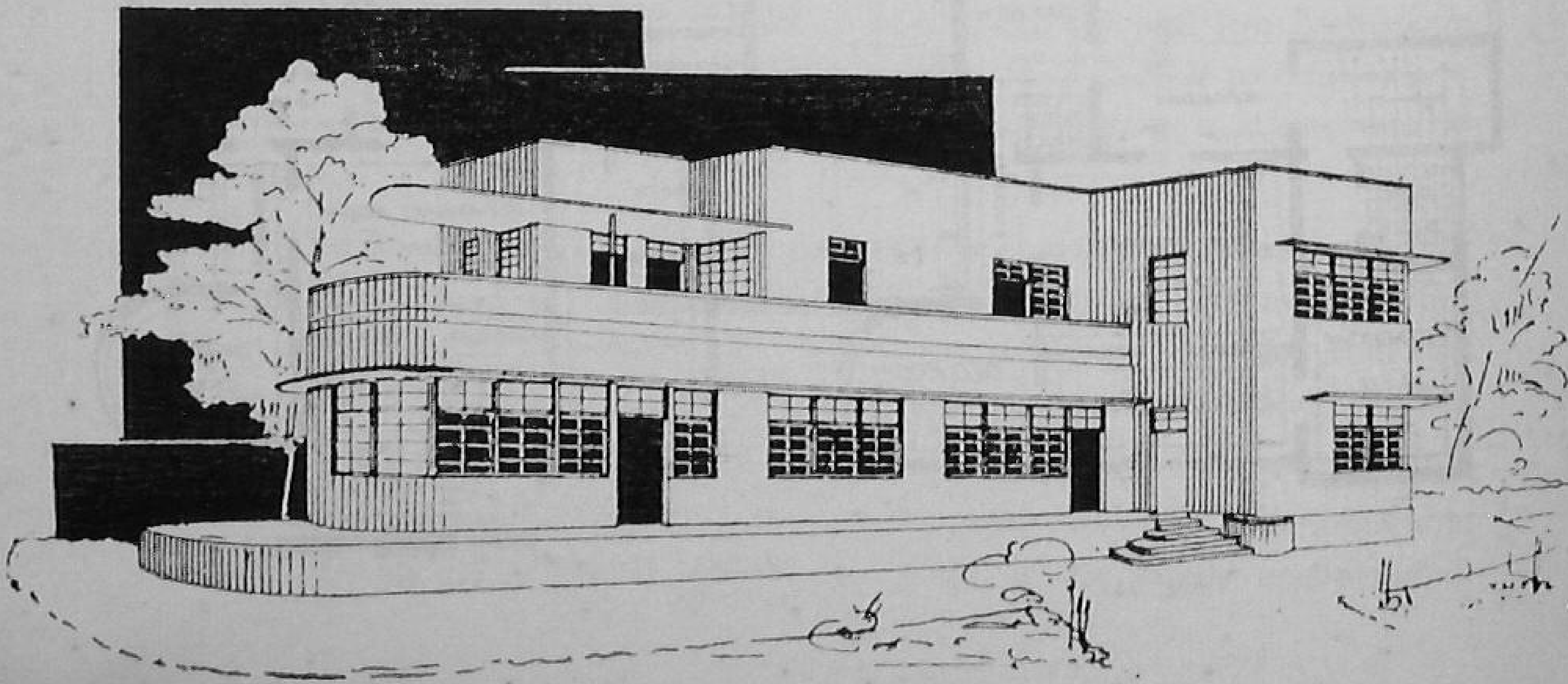


Fig. 243

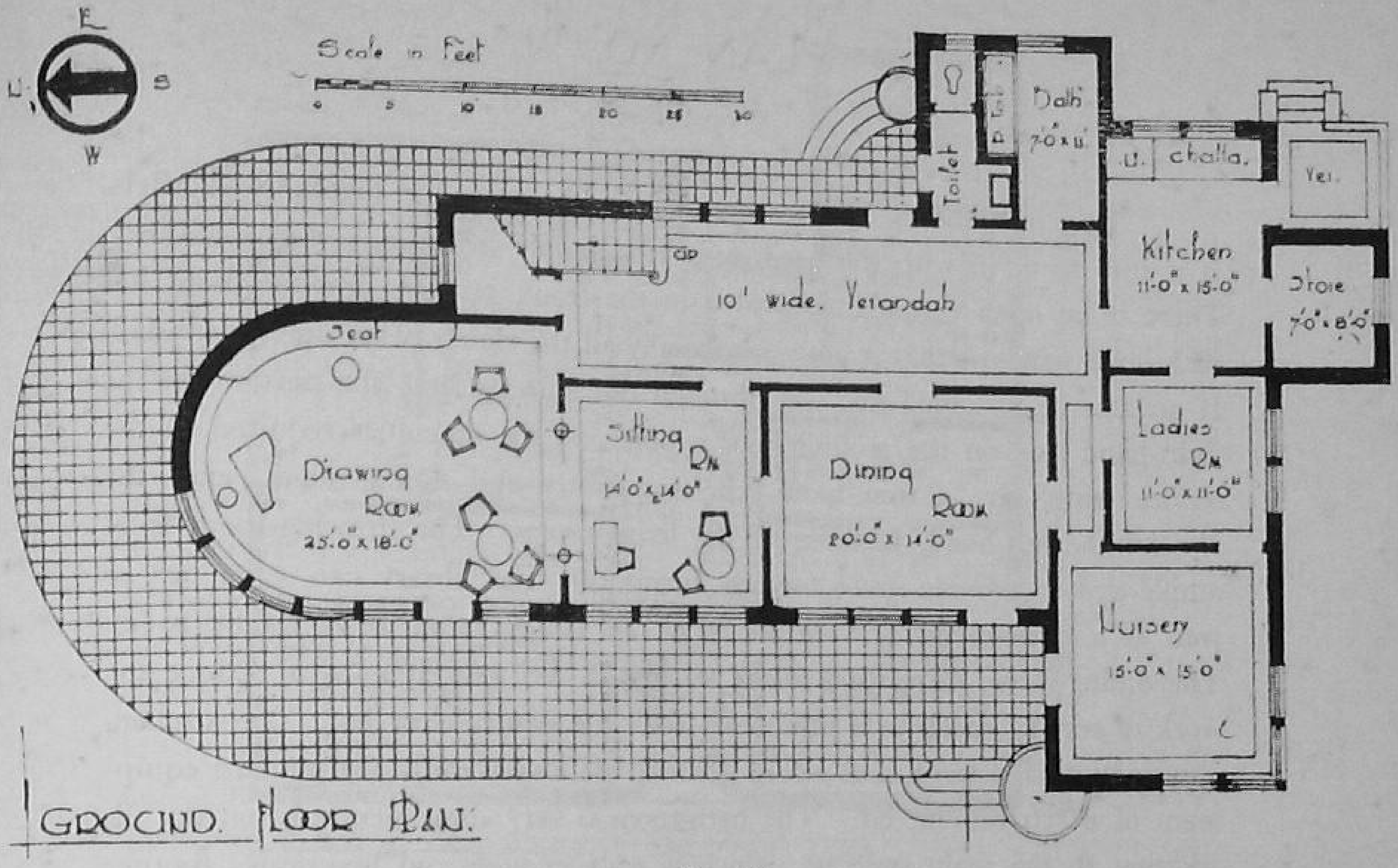


Fig. 244

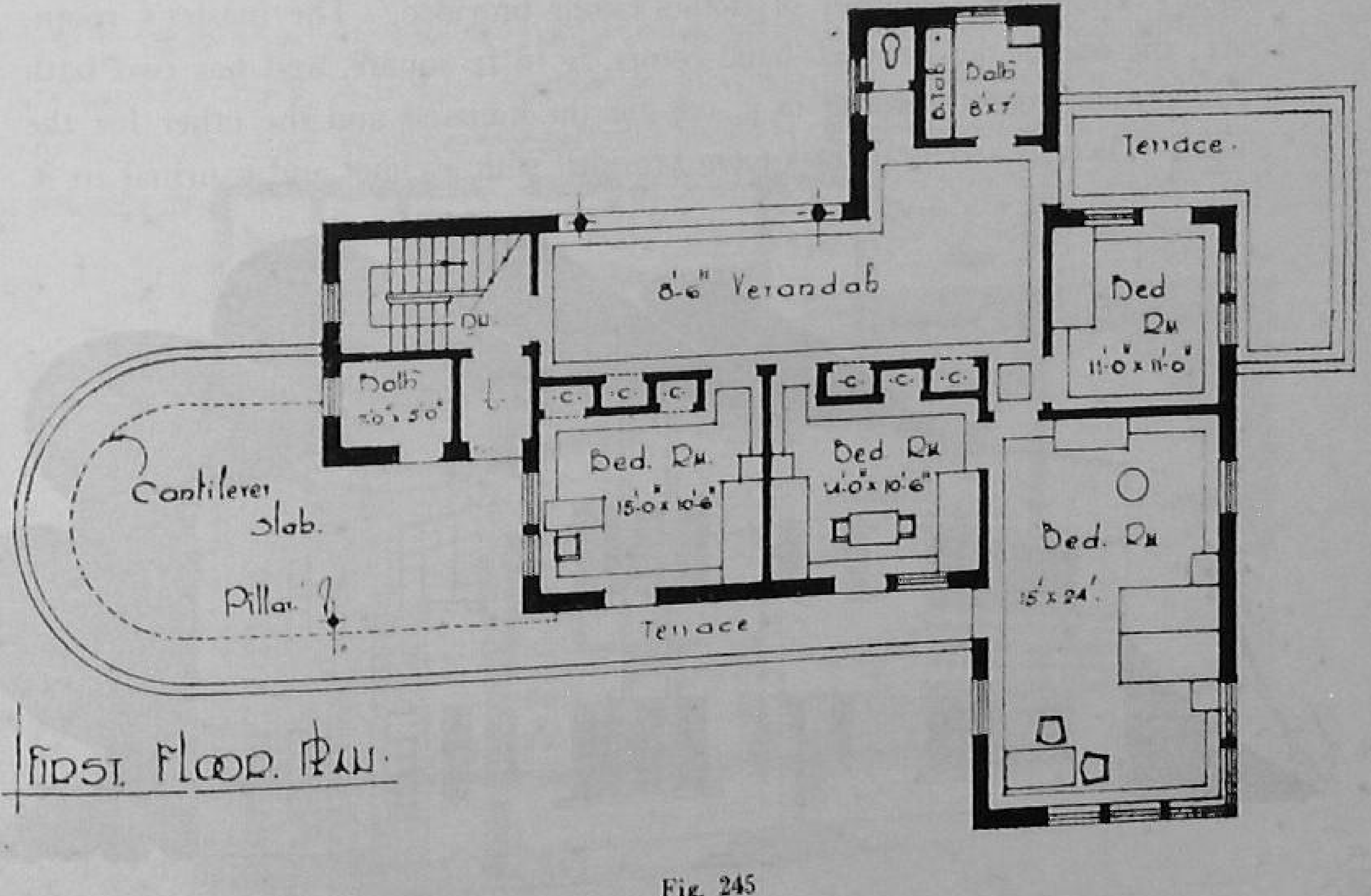


Fig. 245

PLAN NO. 91

Floor Area: 4,558 sq. ft.

Pre-War Cost: Rs. 19,500

THE outstanding characteristic of this home is the flexibility it offers. It is sure to fit in with the needs of a rich family living in a stylish manner. There is no open verandah provided in the front, but the drawing-room has such large windows that it answers virtually all the claims of an open verandah. If an axis be imagined mid-way through the staircase hall, the portion on the right-hand side on the ground floor supplies all the amenities required in the service wing, viz., a store-room, kitchen, pantry and dining-room, and the one on the left-hand, facilities of the living-rooms. The drawing-room is of ample size to provide space for any furniture. The library can serve just as well as a guest-room, a "comfort room," a ladies' room, or a hobby room. The dining-room, in relation to the kitchen, is well placed so as to reduce the work of serving meals to a minimum, with the pantry close by. The kitchen, also, is unusually large, and would accommodate very easily the modern equipment of a refrigerator, etc. The bath-room is very conveniently situated. In addition to the main staircase, which is wide enough and luxurious, another staircase for servants is provided. The store-room is unusually large and might serve as a kitchen, and the kitchen as a dining-room if an extra room is required. The arrangements on the upper floor are very compact. There are four large bed-rooms with a private bath and dressing-room provided for each. There are a number of clothes closets provided. The master's room, viz., the one in the front left-hand corner, is 18 ft. square, and has two bath and dressing-rooms attached to it, one for the husband and the other for the wife. There is a central cloak-room provided with a closet and a urinal in it.

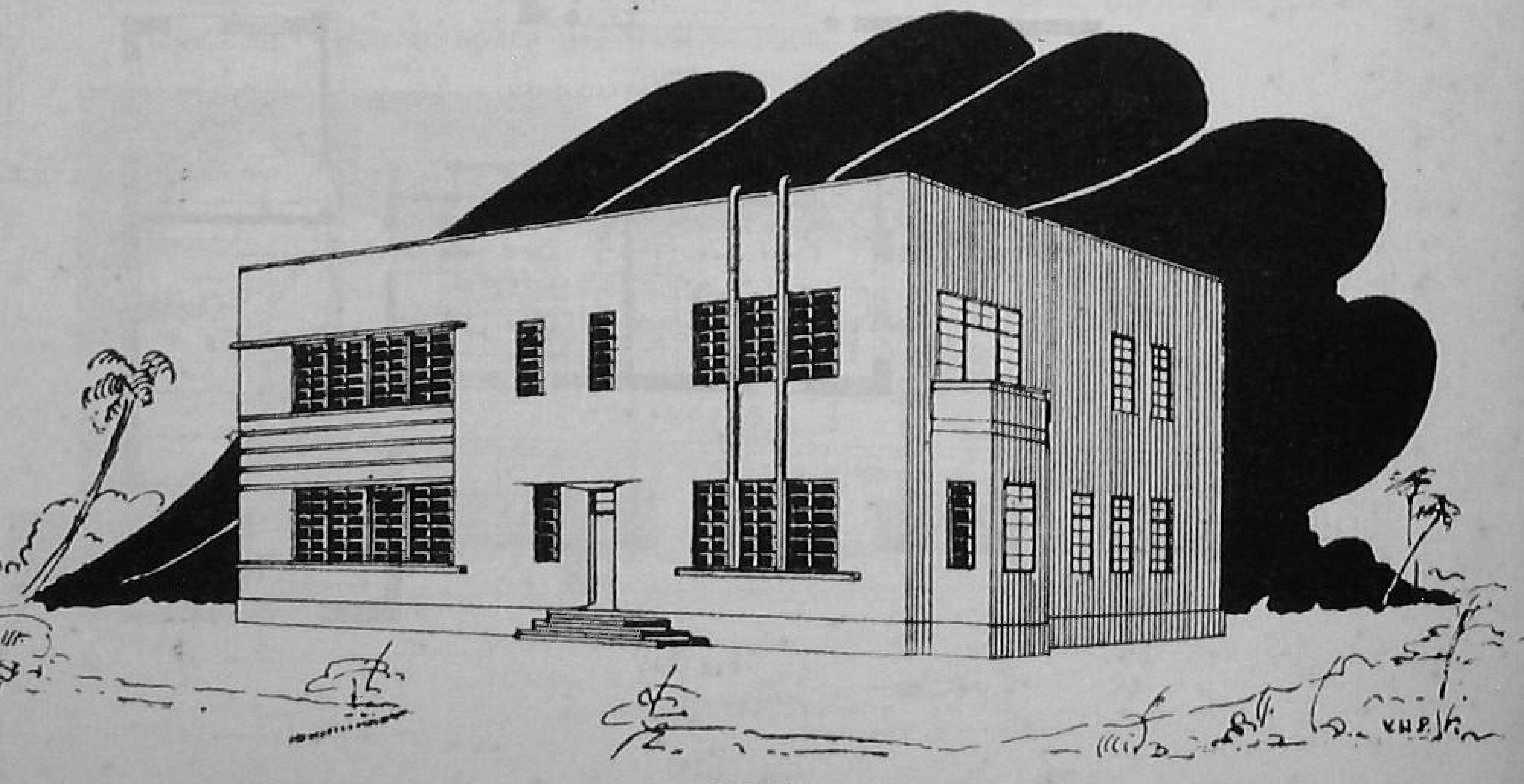


Fig. 246

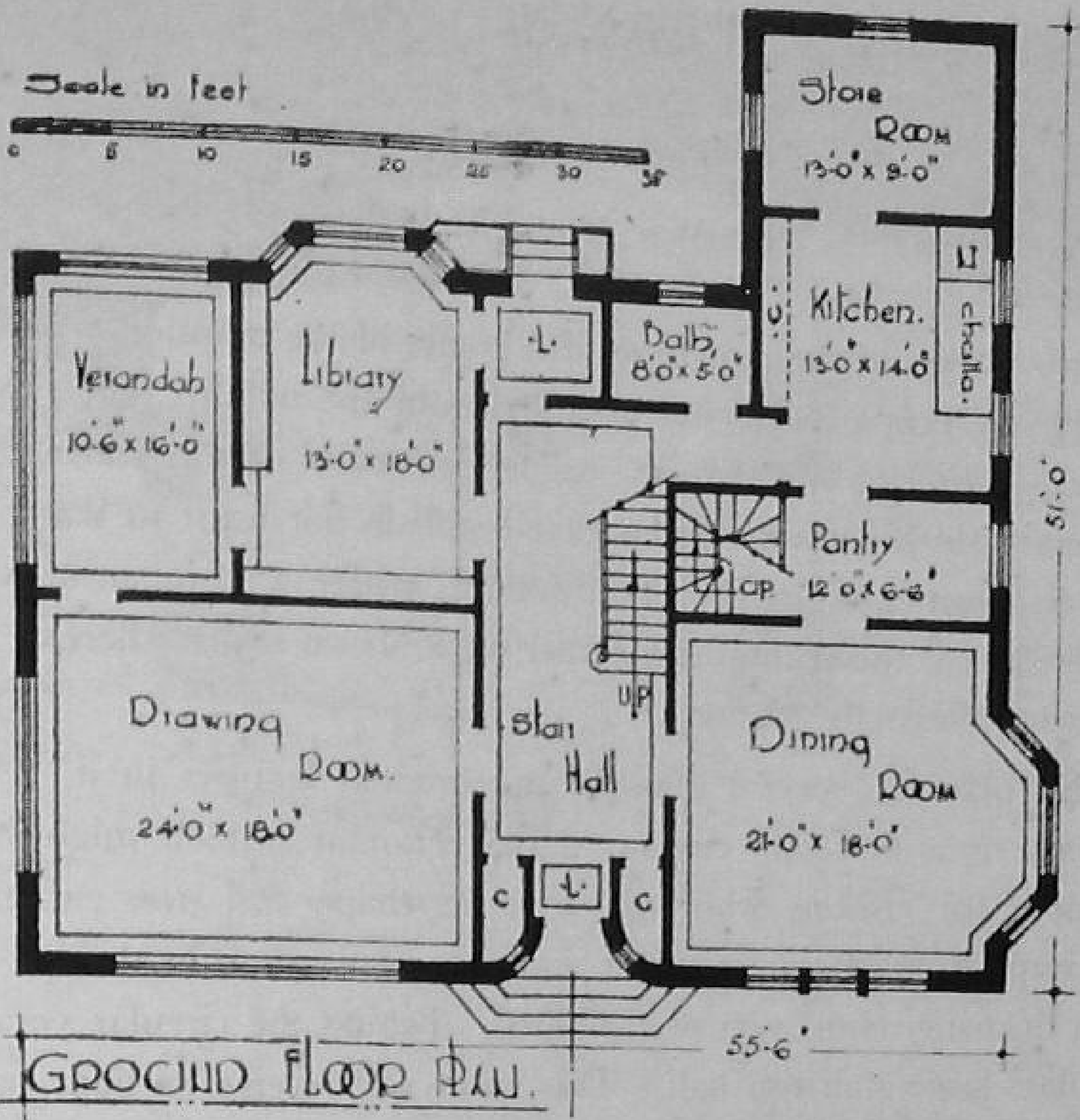


Fig. 247

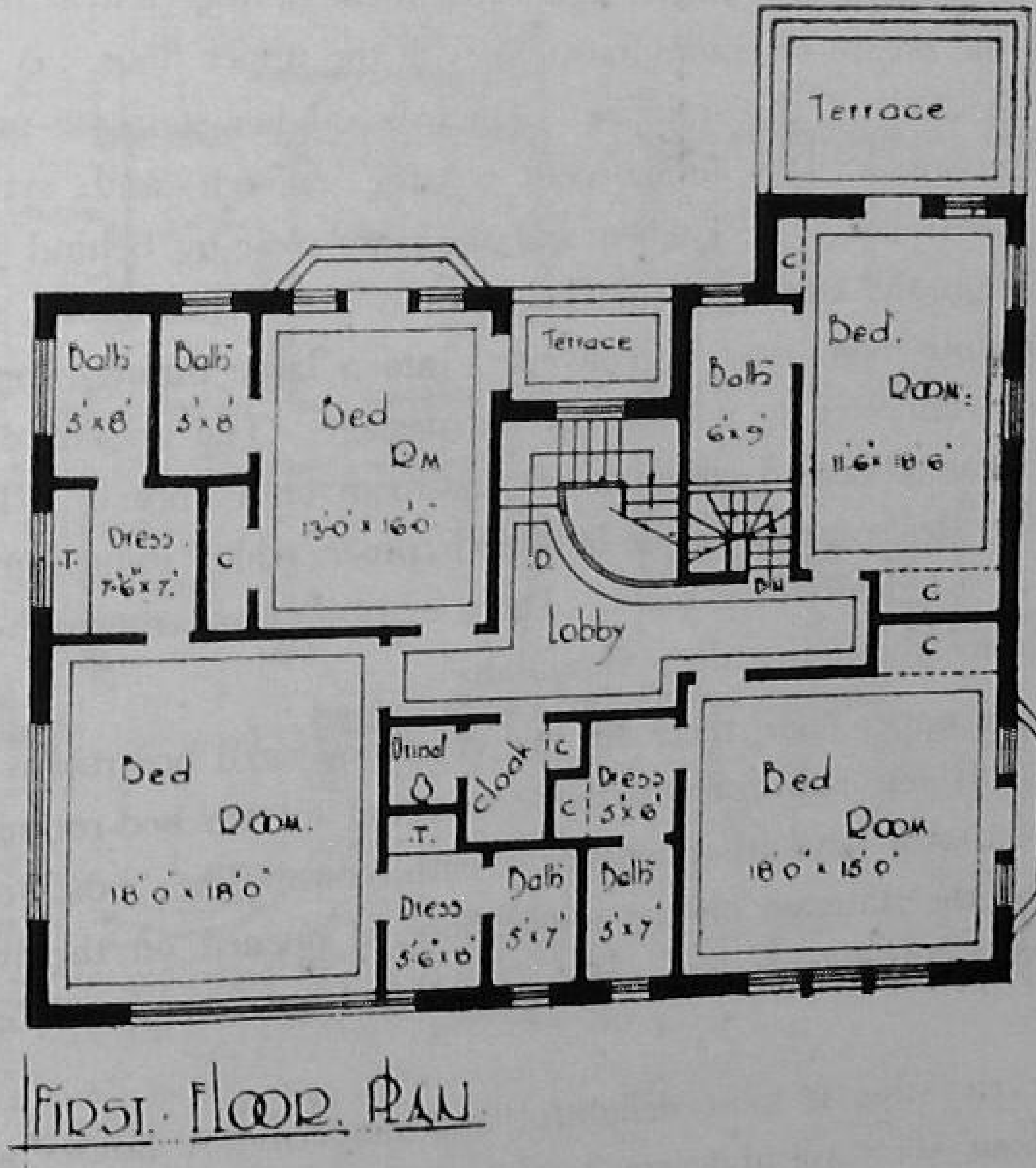


Fig. 248

PLAN NO. 92

Floor Area: 4,550 sq. ft.

Pre-War Cost: Rs. 19,580

THIS is one of the most beautiful homes of the mansion type, and solves the problem of people belonging to the class of the nobility, such as *Rais*, big *Zamindars, Jagirdars*, mill-owners, ruling princes of small states, etc., who want to maintain a certain standard, and still do not want to waste money in unnecessary luxuries. On the ground floor, where a number of visitors are to be interviewed, the planning is rather on a liberal scale, whereas, the upper floor is most compactly planned.

This plan has several unusual and original features in it. At the entrance, there is a perfectly circular, large verandah, which might serve as a waiting-room for visitors, who will, from its shape and size, gather the first excellent impression of the grandeur and magnificence. On the left-hand side is a large drawing-room, very well lighted. Behind the circular verandah is a semi-circular, large staircase hall. This room will receive its light partly from the rooms on the sides and mainly from the large window on the front side at the top. An easy and luxurious staircase is provided in this hall which would serve two purposes—firstly, as an ornament or the central feature and, secondly, as the means of communication with the upper floor. A lift can be installed in the well of this staircase. There is another staircase provided for the use of servants. The dining-room is large enough and symmetrically situated in the front. The kitchen and store are close-by behind it. But, if it is desired that the kitchen should be away in a detached block, the present kitchen and store-room may be converted into a large dining-room with the kitchen block connected to it by a covered passage. The present dining-room can, in that case, be used either as a guest-room or a library. There is a study-room on the rear side in the left-hand corner, which some families might like to use as a ladies' sitting-room. There is, besides, a large bath-room, and a back entrance through a deep verandah.

On the upper floor, there are five very good sized bed-rooms with three bath-rooms. If one bath-room is made common to two bed-rooms, the master's bed-room will have its independent bath-room. The "box" on the left-hand side of the staircase on the upper floor, if opened on the terrace side, would provide an independent access to the front terrace from all the rear rooms.

The elevation is most delightful and modern. A house occupying a space of about 58′ × 40′ and providing six living-rooms, with all the amenities which the modern civilised life requires, is really a marvel.

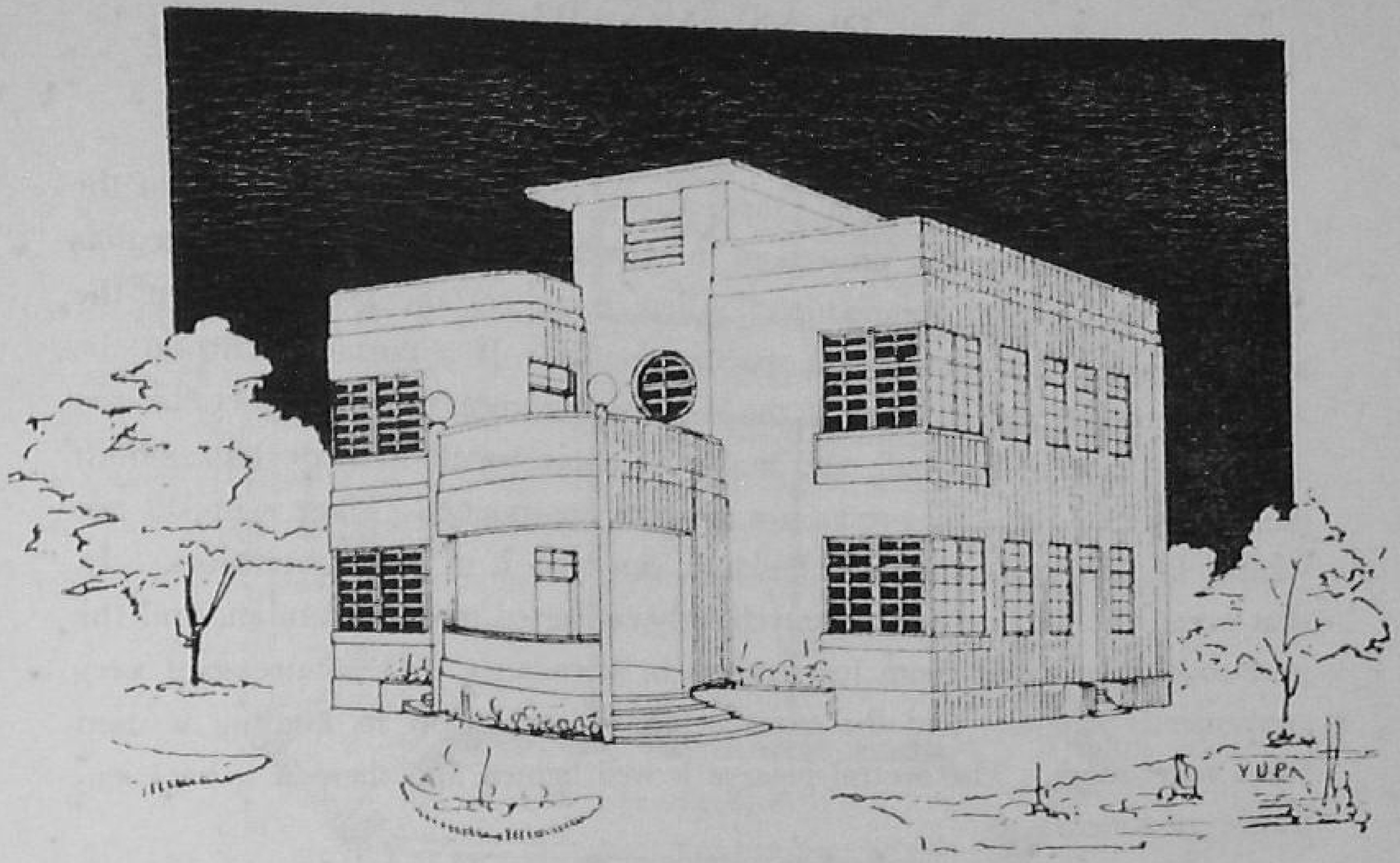


Fig. 249

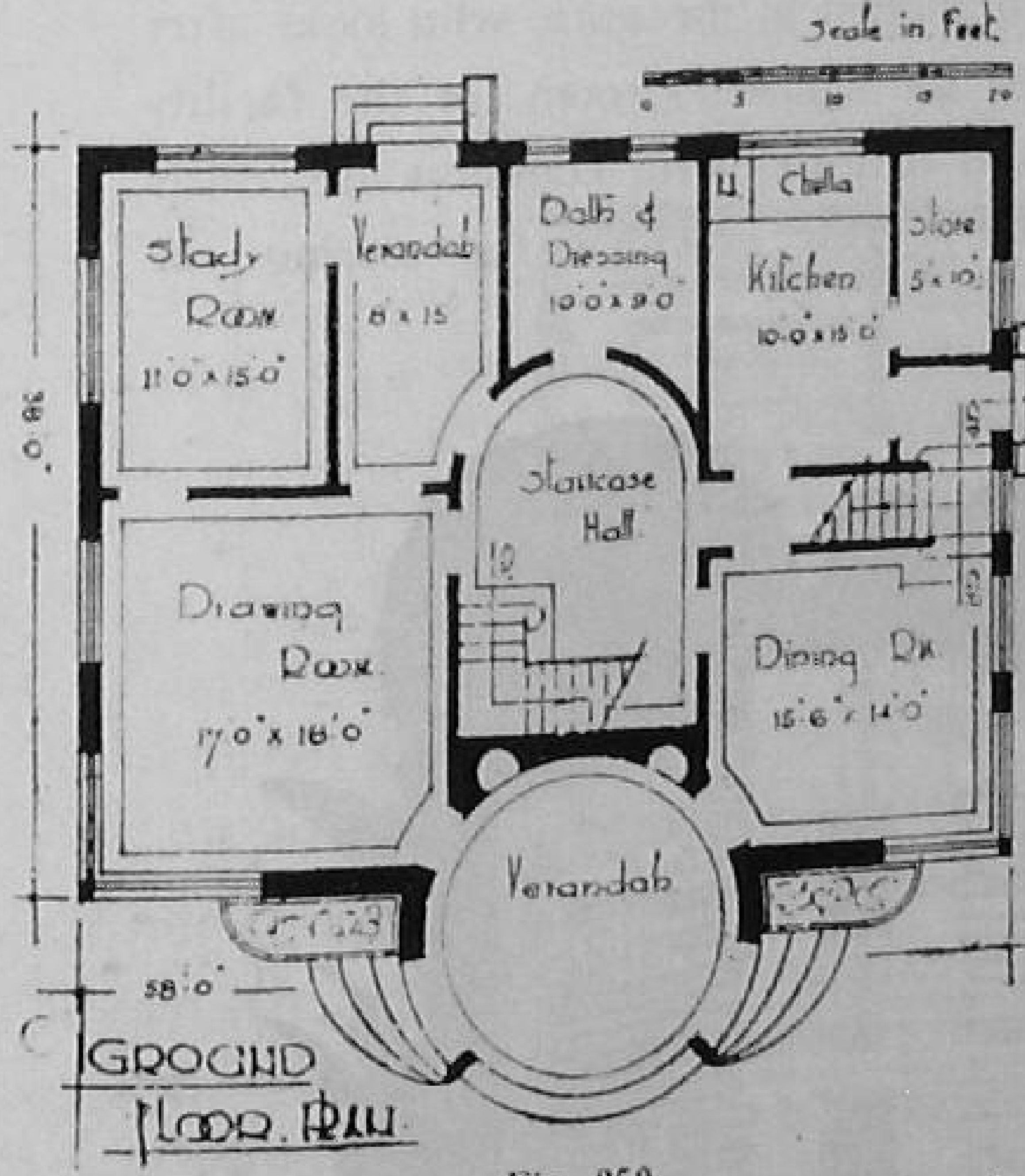


Fig. 250

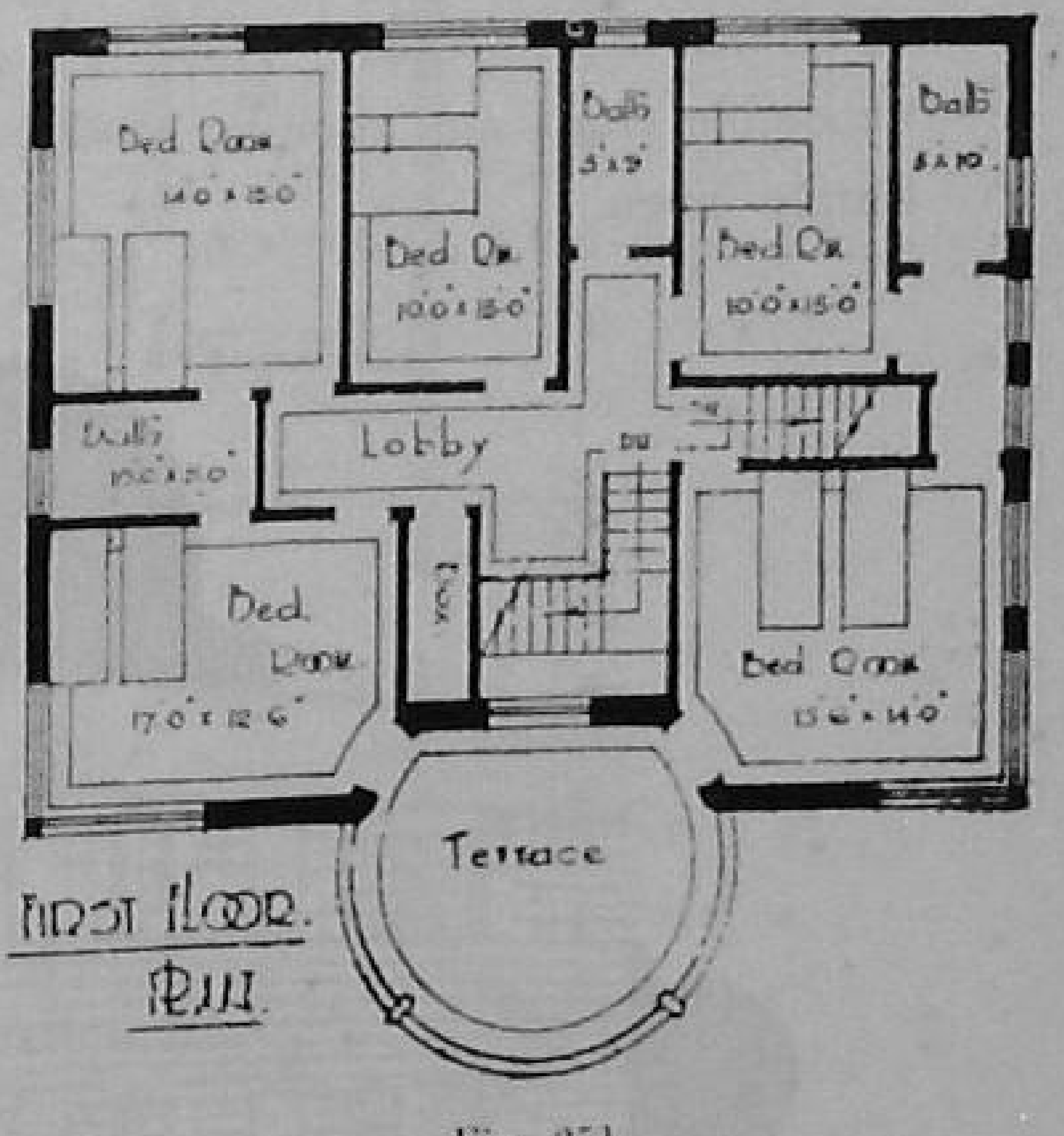


Fig. 251

PLAN NO. 93

Floor Area: 4,562 sq. ft.

Pre-War Cost: Rs. 20,000

THIS luxury residence has three artistic verandahs on three sides on the front, and two square bay projections in corners, which have added a peculiar charm to the general composition. There is an entrance verandah on the left-hand side, which leads to a spacious lounge. If a portable curtain be erected across it, just in front of the staircase entrance, it will correct the too elongated shape of this hall, and make a separate small staircase hall. Both the library and the dining-room are spacious apartments. Those who do not want a kitchen inside the main building, can have it in a separate block. In that event, the kitchen can be conveniently converted into a verandah, and the store-room into a rest room for servants in attendance. The staircase is very conveniently situated, and the space behind it and below its landing is used for a toilet-room. The central passage is well lighted and there is a back entrance provided.

The second-floor plan gives real luxury to the owner's private suite. All the bed-rooms have cross ventilation, and every one of them is exposed to the south-west breeze. Two large end rooms have their own dressing-rooms. There is ample space for clothes closets, though they are not shown in the plan. The children's room is opposite to the parents' room, separated by the central passage. A room has been allotted to the *ayah*, who looks after the children, and is placed just adjoining the children's room for the facility of service at any time. There is a general bath-room for common use, easily accessible from any room. A store-room is also provided for storing the family linen.

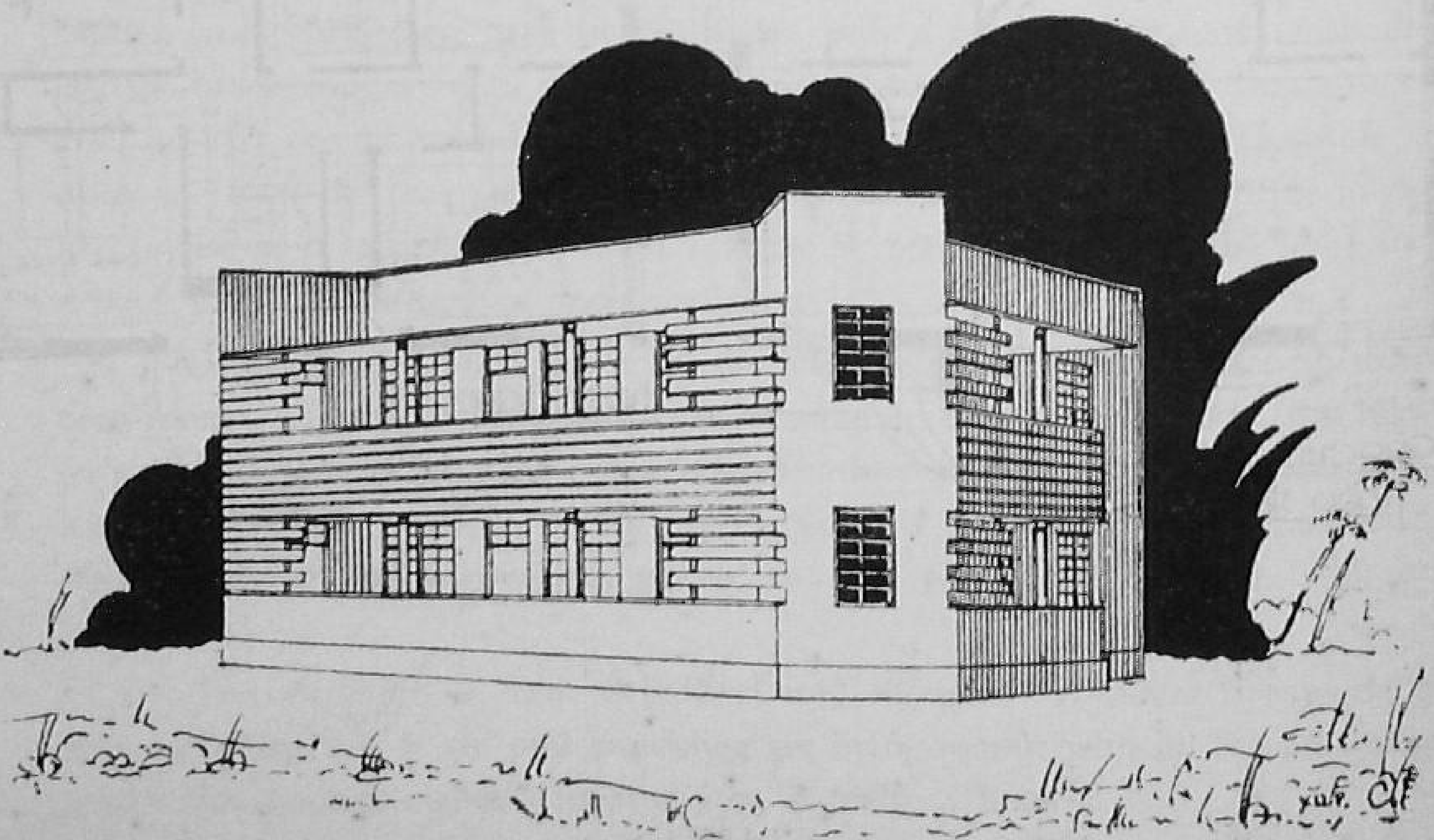


Fig. 252

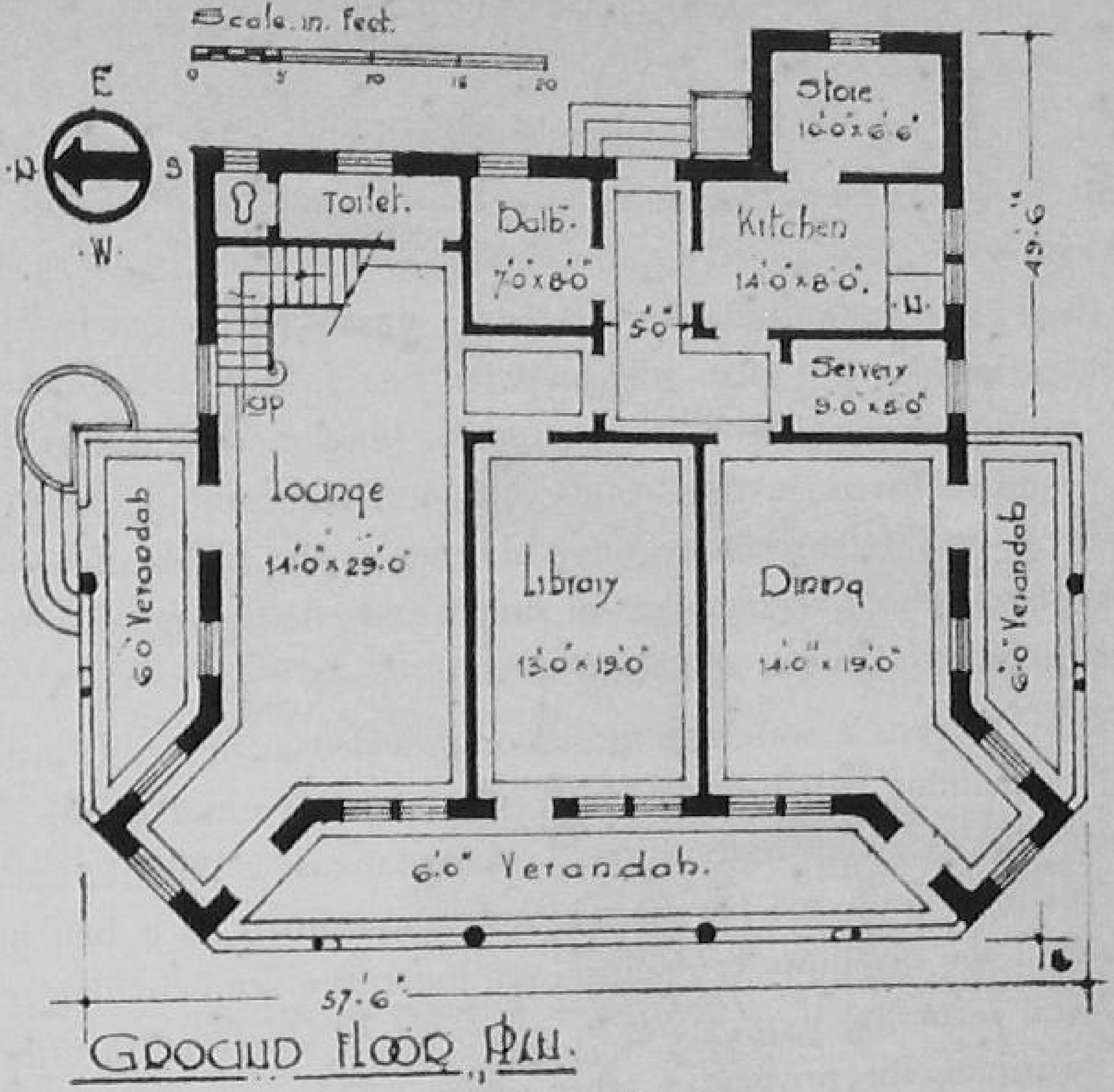


Fig. 253

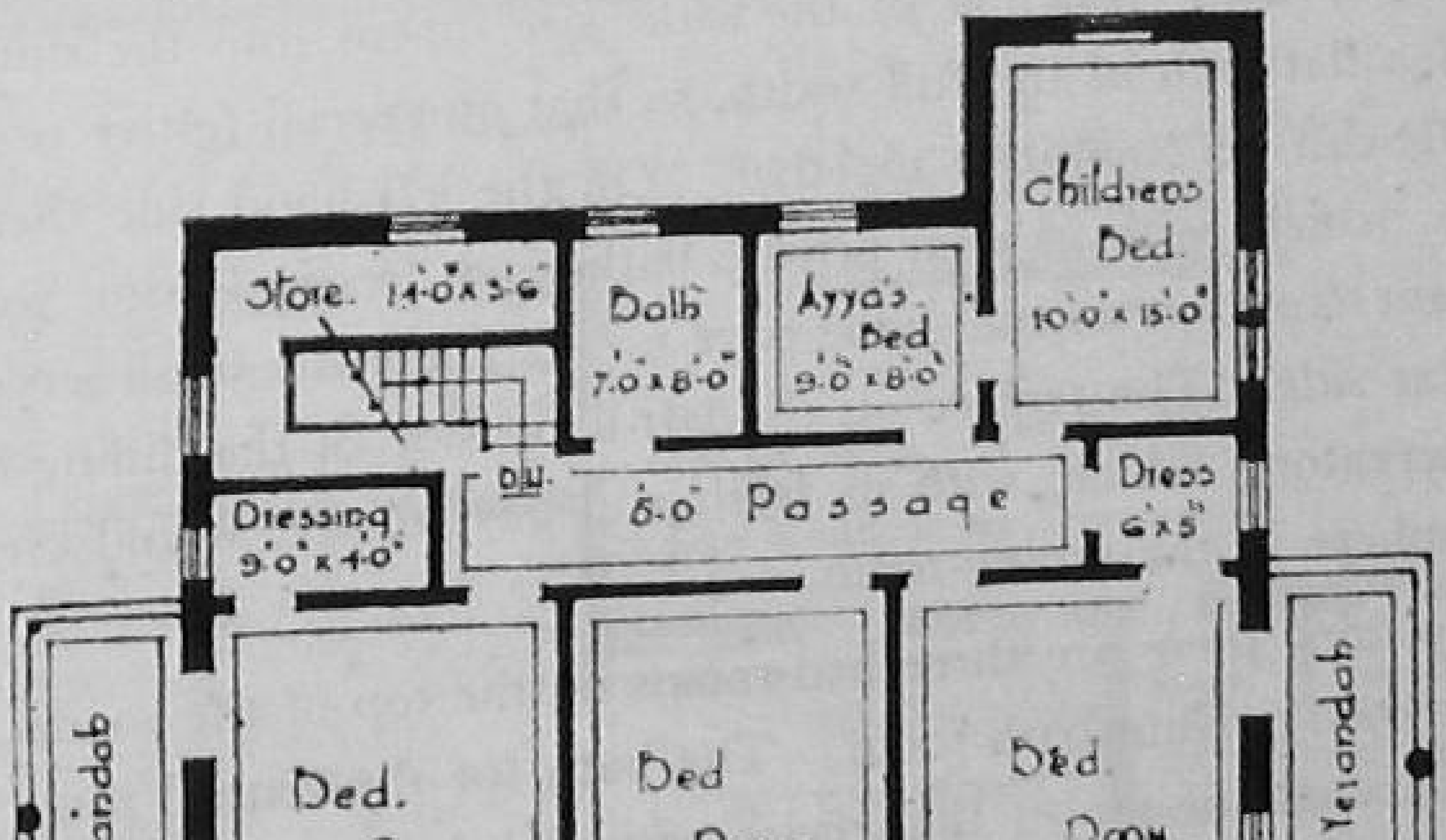


Fig. 254

PLAN NO. 94

Floor Area: 4,620 sq. ft.

Pre-War Cost: Rs. 23,000

Here is a plan distinguished for its unaffected simplicity. There is every indication that the plan was prepared first to suit the site, orientation, and the requirements of the particular family, in relation to comfort and convenience, and its exterior, which came in logical sequence to suit the interior arrangements, was further given a few touches at the hands of an expert to bring out the balanced arrangement of simple and effective masses, making the whole composition vigorous and unaffected.

Thus, there is a wide entrance door provided at one end, just to leave the entire remaining space of the 10 ft. verandah for uninterrupted use as a sitting-place to enjoy the western breeze. The staircase is placed at the farther extreme end in a projected bay, in which position, firstly, it is best lighted by the wide and low windows extending over the entire semi-circular portion of the bay, and secondly, it provides an independent access to the upper floor without disturbing the privacy of other rooms. The spacious dining-hall has a pantry and servery close-by, and beyond them are the kitchen and store-room, in a separate block attached to the main building by a covered passage. The drawing-room, which is of the same size, opens into the dining-room by means of a flat arch of the full width, so that on special festive occasions, both these halls can be combined together. On the left-hand side there is a large bed-room, which, with its own private bath- and dressing-room, would serve as an excellent "comfort room" (vide page 60). There is a small service verandah on the rear side. The terrace on the left-hand side of the dining-room is used as a conservatory, which, with its fresh and gay foliage, would create a cheerful atmosphere in the dining-room.

Upstairs, there are three bed-rooms on the top of the rooms below, each having its own private bath-room. The bath for the central room is arranged in the gallery on the top of the service verandah below, but of increased width. A spiral staircase is placed conveniently for servants on the left.

The elevation is quite modern and very attractive. The rounded staircase bay adds variety, and focusses the eye, and for balancing it, the bed-room on the right-hand side projects a little forward. Again, wall surface is massed on the left-hand side of the entrance, in contrast to the concentration of the window area on its right-hand side, where the western breeze to the lounge and the sitting-room behind is most in demand. The rounded portion of the staircase is raised not simply for beauty, but it serves a definite function, viz., of housing a hot-water tank.

Fig. 255

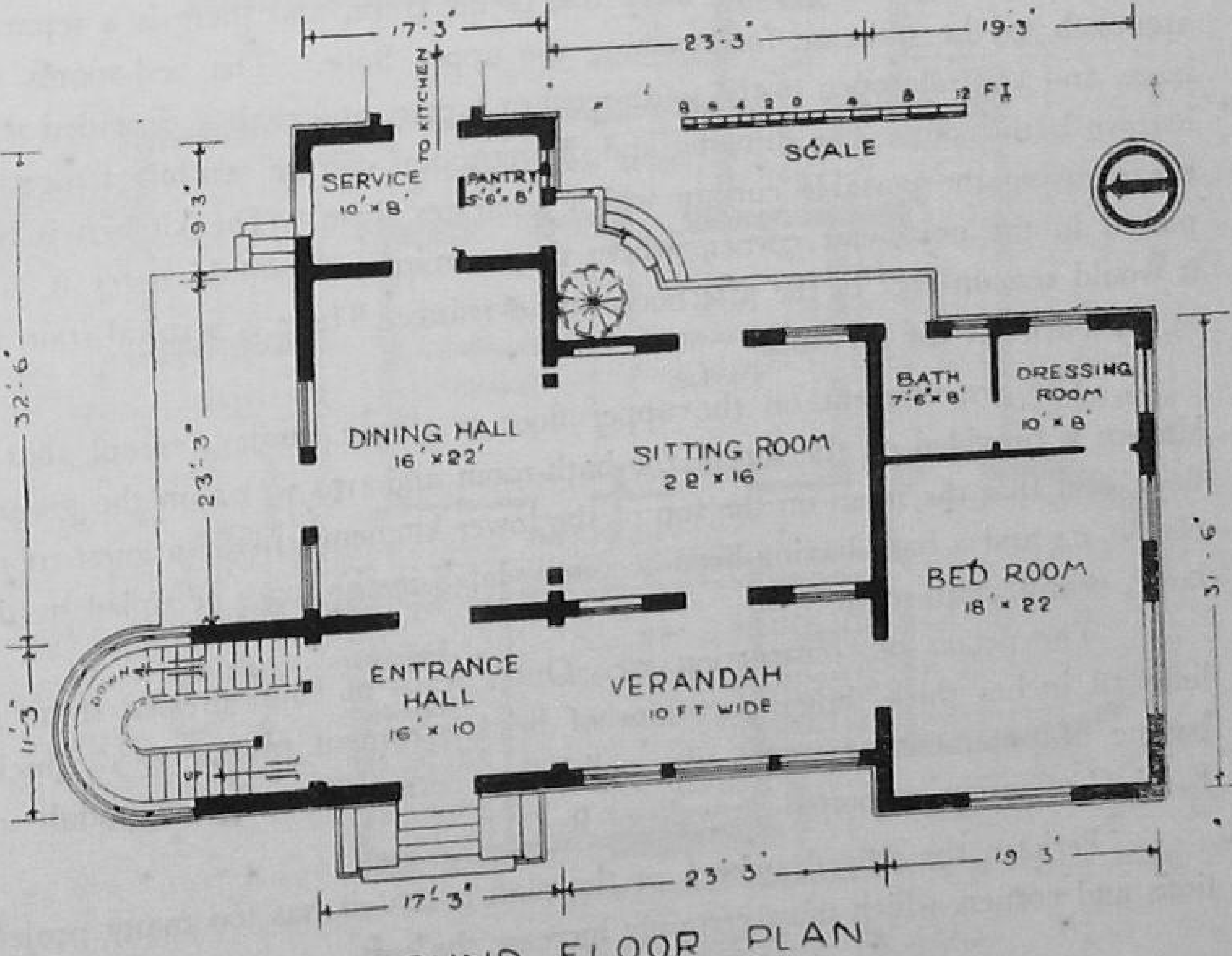


Fig. 256

Architects: M/S. GREGSON, BATLEY AND KING, BOMBAY.

PLAN NO. 95

Floor Area: 4,700 sq. ft.

Pre-War Cost: Rs. 23,500

THE smart home pictured here is designed on modern lines, in which there is a nice blending of a few traditional details, which have added a new zest and flavour to the architectural composition. The face masonry of stone, the snug, tiled roof, and the bold, trim lines in the exterior give it an expression promising efficiency, comfort, strength and durability.

It is planned for luxury rather than for economy for a family of only three members living in a stylish manner. That is why so much attention is given to circulation rather than to compactness, by providing a number of verandahs and a wide, central passage, which have made every room, including even the kitchen, such an independent unit by itself that it can be entered independently from two directions. Intense business requires the family, normally, to live away from the place. They have, therefore, built the home mostly for an occasional week-end occupation. It is, therefore, so cleverly planned that the family can occupy either both the floors, if they have in view to invite a number of guests in a particular season, or they can rent out the ground floor as a separate flat, and reserve the upper for their own use.

To suit this arrangement best, the main entrance is kept on one side of the verandah, instead of the usual one in the front, and there is a separate approach to the staircase for reaching the upper floor. The bed-rooms are large, and are fully open to the south-western breeze, and each is provided with its own bath-room. The drawing and dining-rooms can be combined together by removing the portable curtain which separates them. The kitchen is best placed in the north-east corner, where the morning sun would enter it, and it would remain cool in the afternoon and evening. There is a spiral staircase at the back for the servants.

The arrangement on the upper floor is almost similar, except that a kitchen is provided on the top of the bath-room and two w. c.s on the ground floor, and that the room on the top of the lower kitchen is made a guest-room, two w. c.s and a bath having been accommodated in the space occupied by the large, central bath-room.

The details of construction are: Outer walls of chisel-dressed stone in lime 18 inches thick, inner partitions of brick-in-cement mortar 4½″ thick; paving of ornamental terrazzo tiles polished *in situ;* pillars in verandah of R. C. C., flooring supported on walls of R. C. C.

Perhaps the only drawback of the plan is that it has too many projections and corners which must certainly increase the cost.

Fig. 257

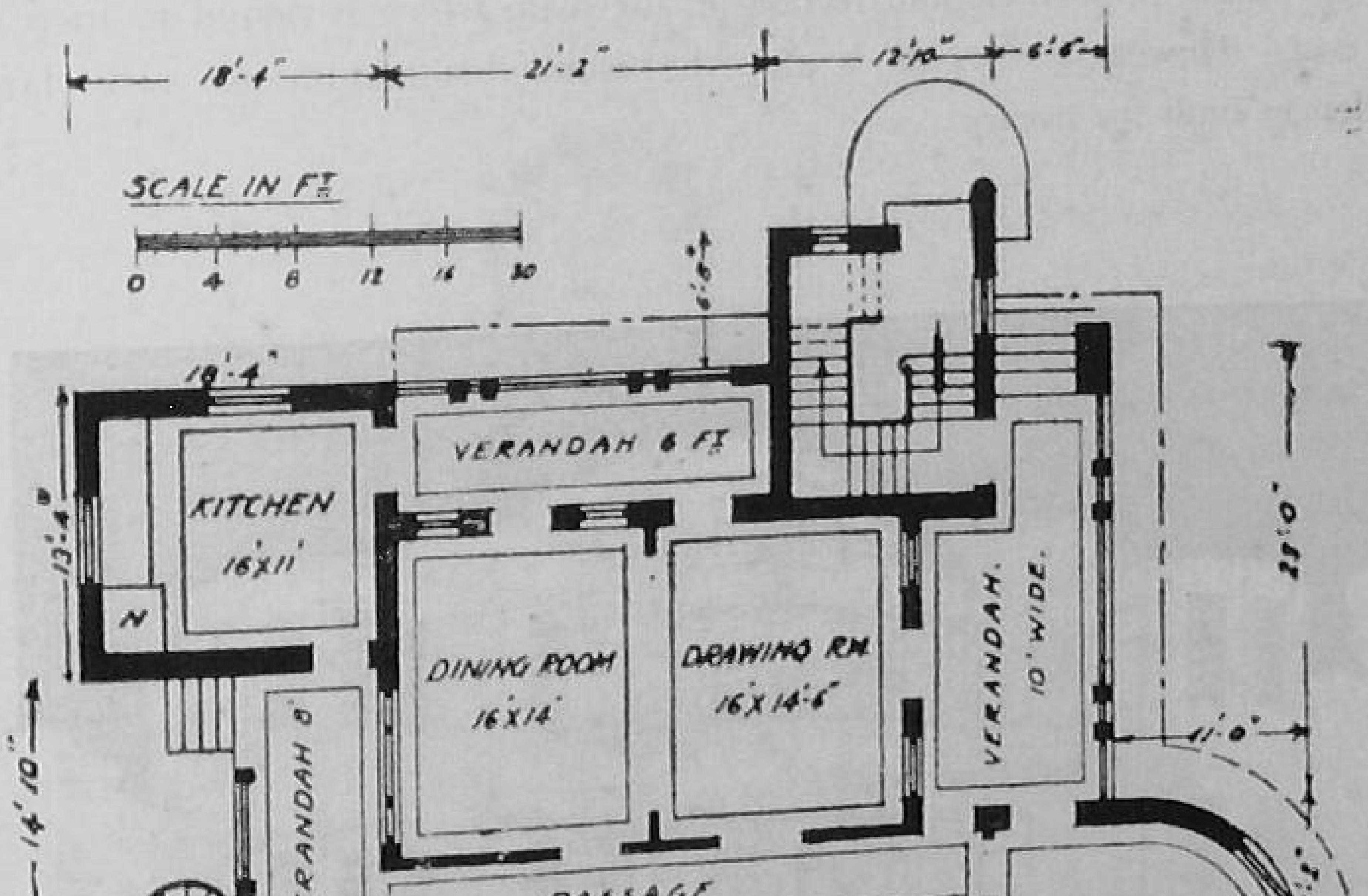


Fig. 258

PLAN NO. 96

Floor Area: 4,790 sq. ft.

Pre-War Cost: Rs. 24,000

THE house represented by the plan here is of a mansion type with the main front in the west direction. The grouping of rooms on the front is made symmetrically with respect to the quarter-circular verandah in the centre. The woman's rights are fully acknowledged by giving as much prominence to the ladies' apartment as to the drawing-room. The kitchen, store, pantry, bath- and dining-rooms are all very well grouped, close to the ladies' apartment. The staircase hall with verandahs on both sides, would be a very good, informal, cool room for sitting. In the "well" of the staircase an electric lift can be very conveniently installed.

Upstairs, four excellent bed-rooms (one of them, viz., the master's room provided with a dressing-room), a common bath-room, a verandah and a staircase hall are provided. A site on the top of a hill, or facing a large river or sea, would be ideal for the home. The one defect of the house is that there are too many projections and recesses in the plan, which is bound to increase the cost. However, economy is not the main desideratum of such large residences built for luxury.

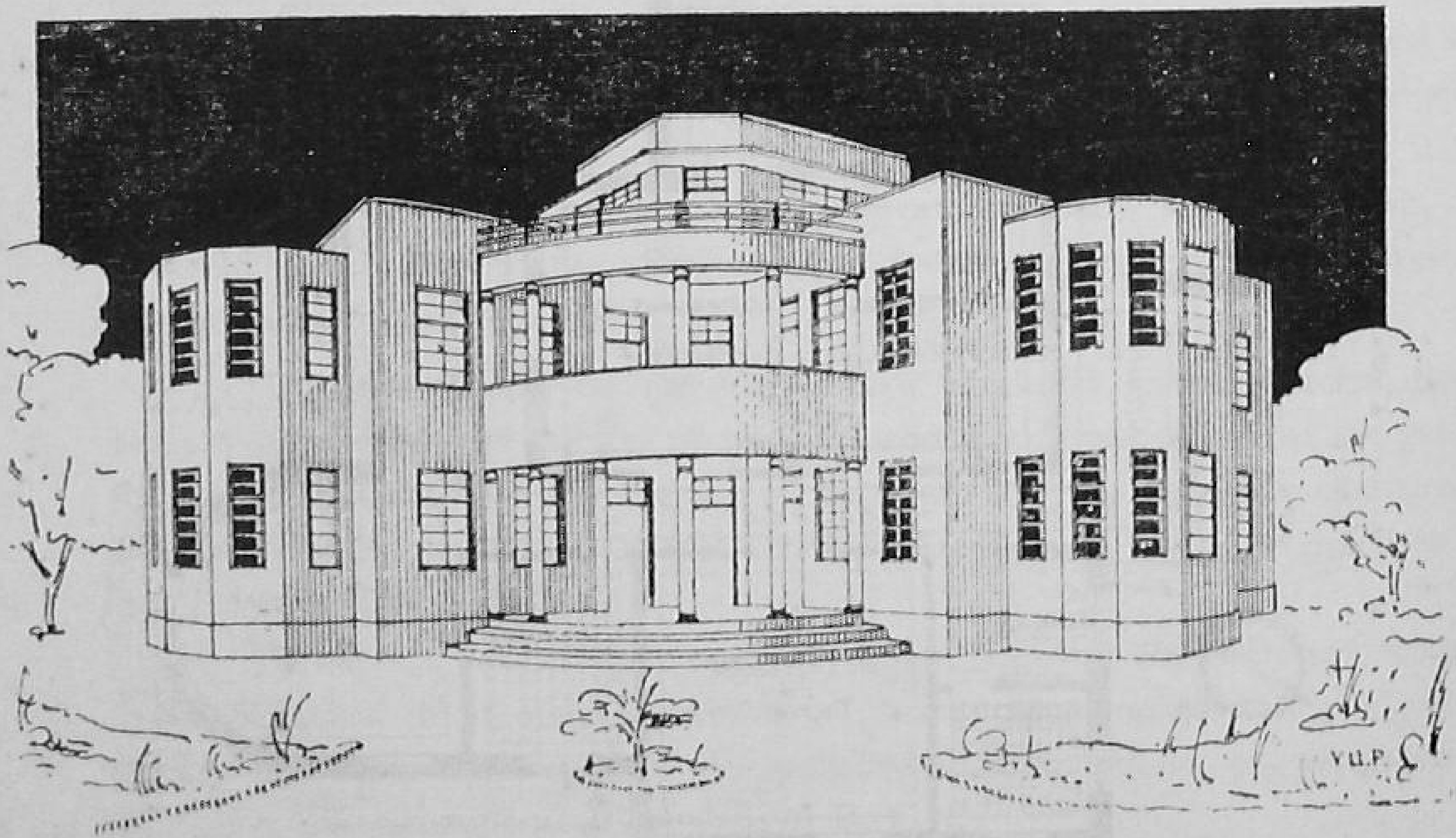


Fig. 259

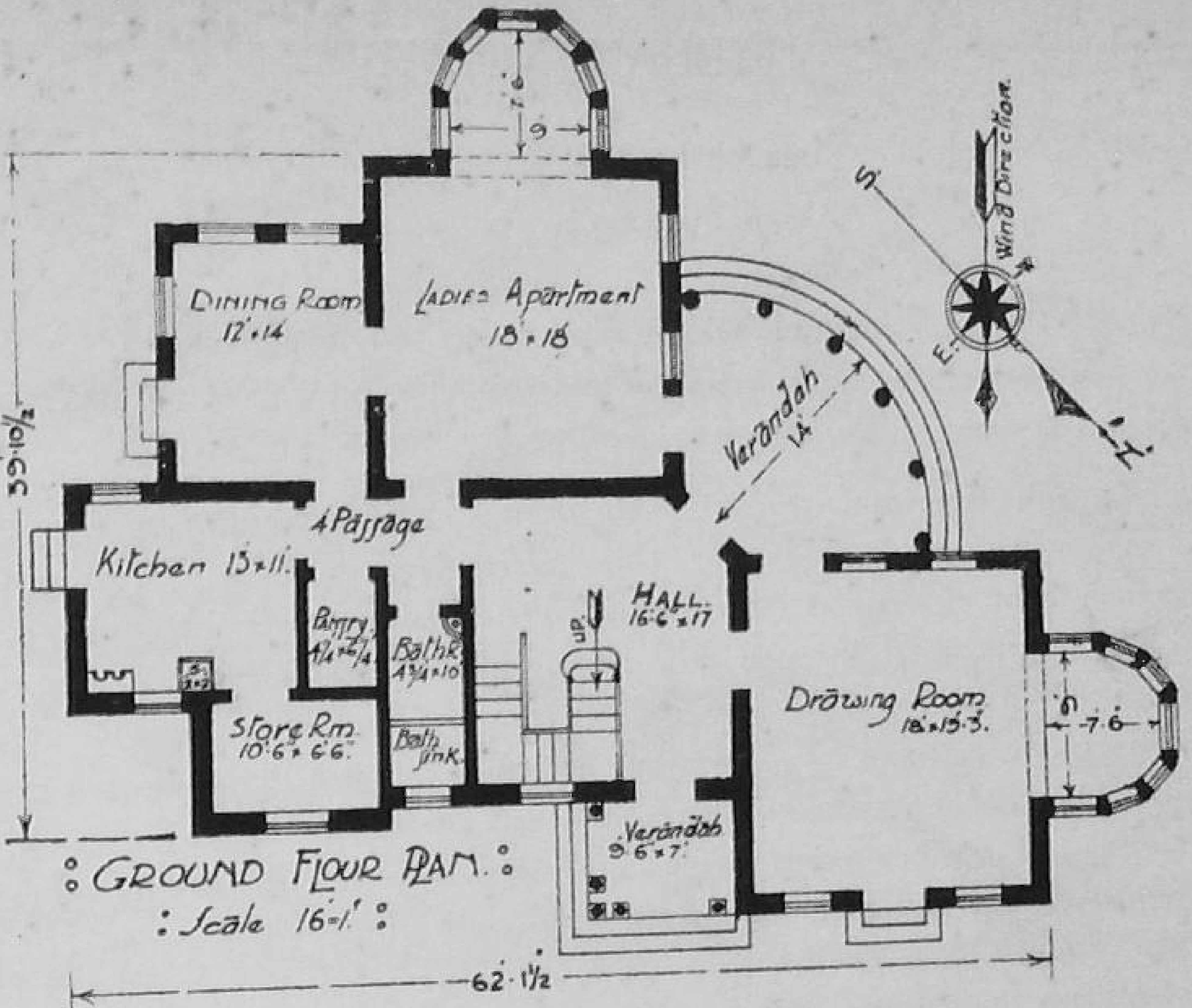


Fig. 260

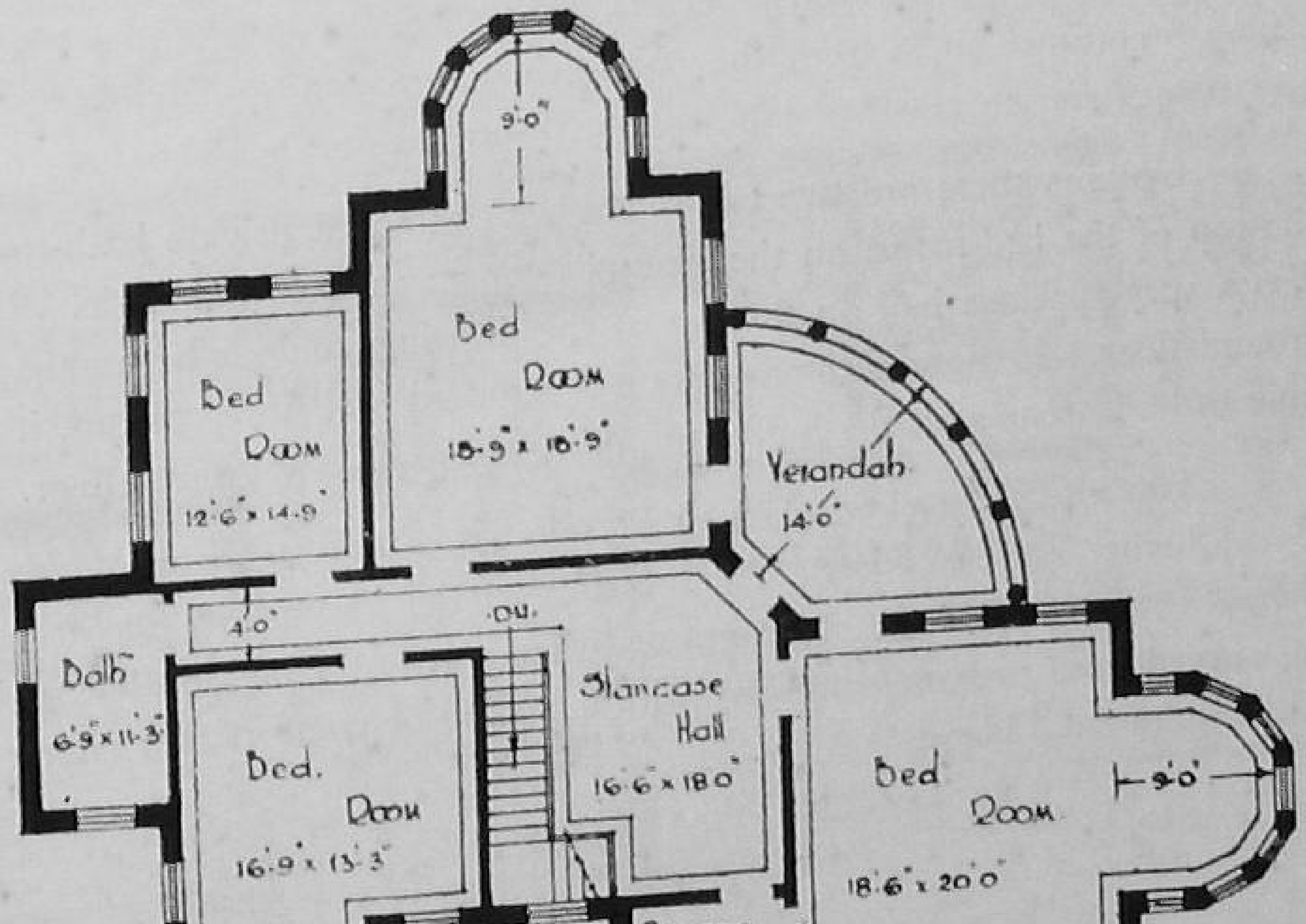


Fig. 261

PLAN NO. 97

Area of Each Floor: 2,440 sq. ft.

Pre-War Cost: Rs. 20,500

THIS is a charming villa, frankly modern in design, suited for southern or south-western facing. Ample light and ventilation and, above all, spaciousness is the keynote of the design.

The segmental verandah in the front is 17 ft. deep and at once impresses the visitor as something grand. The concrete flower boxes at both ends of the round flight of steps at the entrance with colourful flowers or lovely crotons grown in them are in good taste and inviting. The spacious drawing-room with a wide sweep of windows, separated by a folding screen from an equally spacious dining-room, is another special feature. When the screen is removed it would make a very good congregation hall rarely to be found in an ordinary home. All four bed-rooms are of ample size with plenty of space for providing clothes closets, and each is provided with a private bath-room. The building was designed for a locality where there is no sewerage or water carriage system of underground drains, and therefore each bath-room is provided with a door for a sweeper in the outer wall. On the right-hand side of the dining-room there is a utility room, which may be used even for an office, as there is a separate entrance to it from the back below the staircase landing for clerks and *pattawallas* to enter or exit without disturbing the household.

Upstairs there are two bed-rooms with attached private bath-rooms on the top of the bed-rooms on the ground floor on the left-hand side. There is also a very spacious hall on the top of the drawing- and dining-rooms on the ground floor. If more accommodation is required and funds permit, it is possible to build rooms on the top of the other rooms on the ground floor.

The bird's eye view given in Fig. 262 is in tune with the *de-luxe* plan of the luxury cottage home. Nestling low to the ground on the front side among a luxurious growth of beautiful garden plants, the bold outline of sweeping curved lines presents simplicity with a feeling of comfort that characterises this truly oriental home.

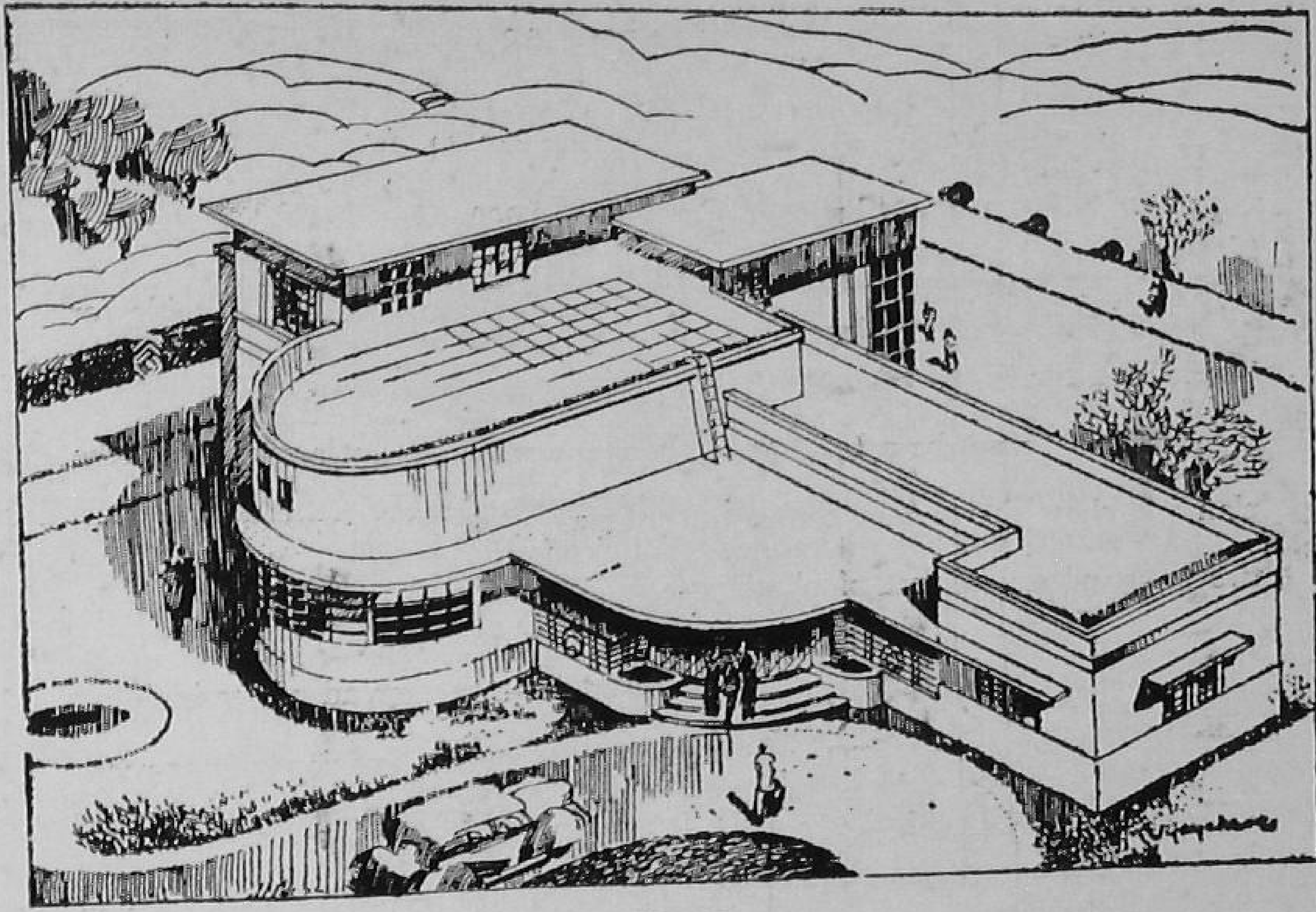


Fig. 262

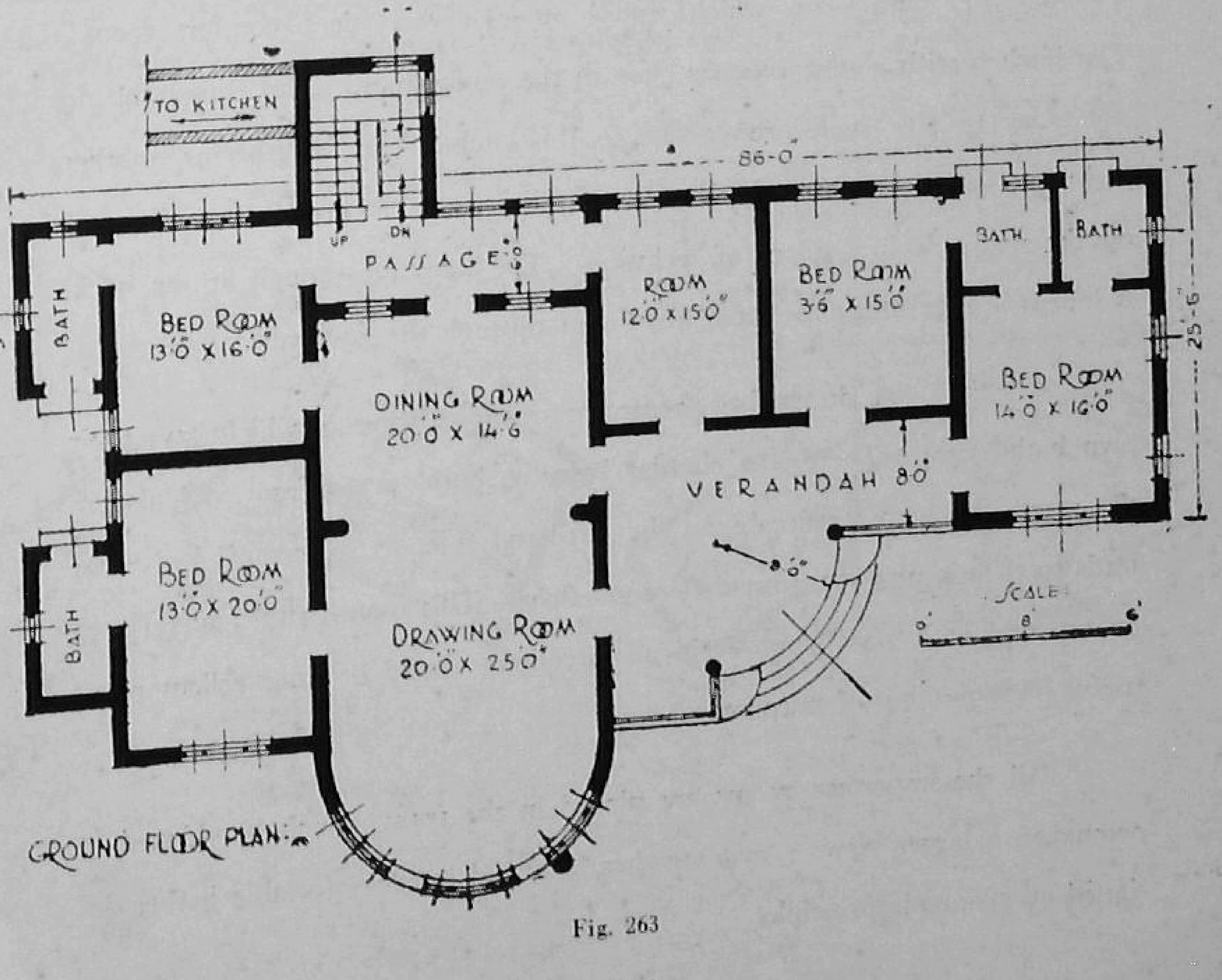


Fig. 263

PLAN NO. 98

Area of Both the Floors: 3,840 sq. ft.

Pre-War Cost: Rs. 19,000

THE plan on the opposite page is of a beautiful building, suitable for an elevated site, commanding a wide view. The magnificent front elevation suggests that it must be a building of the mansion type. But a scrutiny of the plan will show that it is a cottage of ordinary dimensions, covering less than two thousand square feet of plinth area.

A flight of three steps, extending over the entire spread of the building front, leads to an open terrace. A three-quarters-circular, spacious dining-room is arranged in the centre, and on the left-hand side is the large drawing-room 22′ × 14′. At the extreme right-hand side is placed a bed-room with its own dressing- and bath-room, which would prove a very nice "comfort room." The kitchen with a store-room is close to the dining-room. But those who do not want to give such prominence to the kitchen can use this as another bed-room with its separate bath or as a utility room. There is a study-room on the rear side in a place of seclusion. The staircase, though at the back, is independently accessible from any room through the passage.

Upstairs, five decent bed-rooms are arranged, three of which have their own bath-rooms. There is a circular balcony, both in the front and also in the rear. A narrow staircase on the left-hand side of the central bed-room leads to the circular room on the second floor. This room, with a turret roof on top and with glass windows in all directions, would be an excellent room useful for a number of purposes.

All the important rooms are placed in the front, which is widened to command a larger view. An altogether beautiful and comfortable home, designed on economic principles.

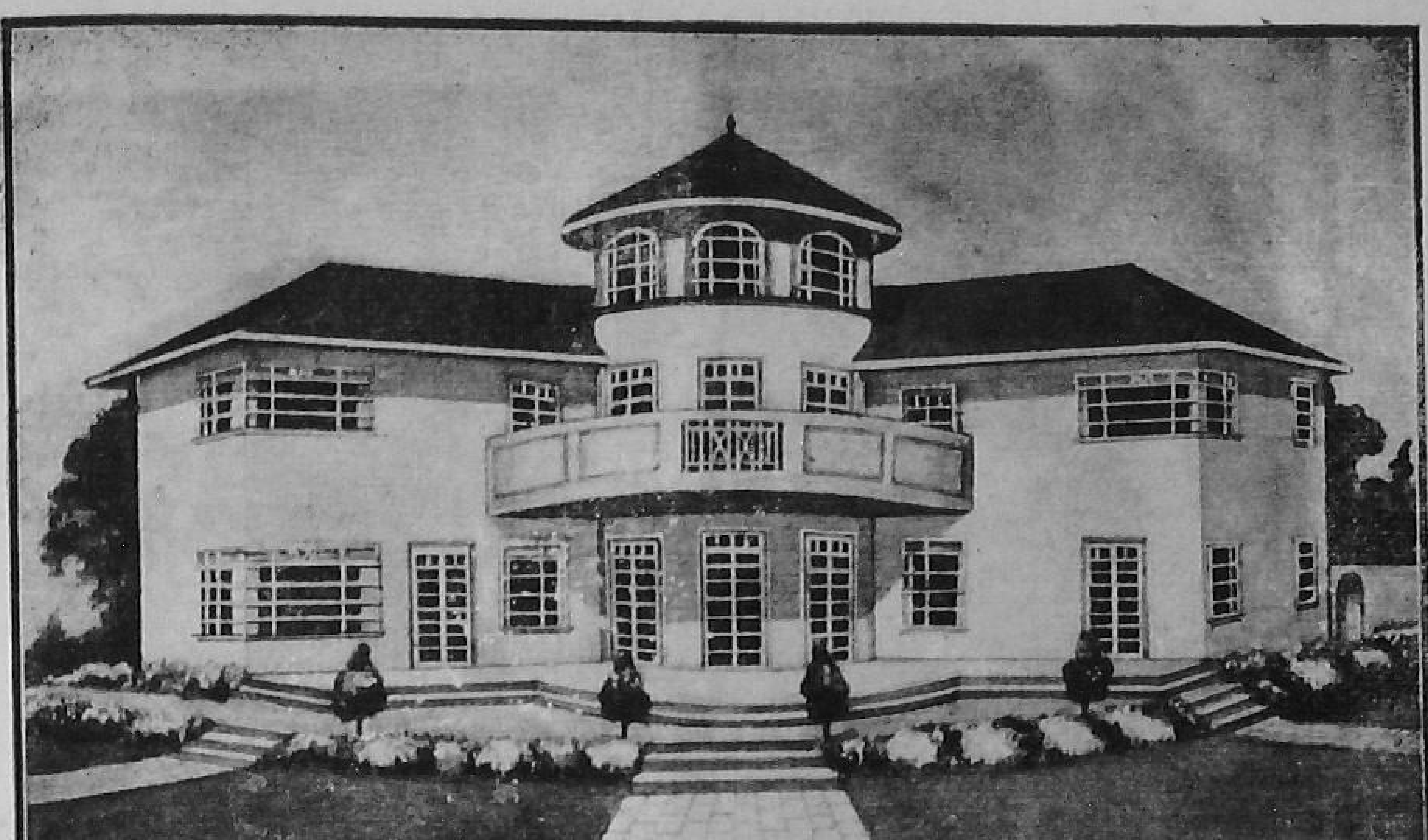


Fig. 264

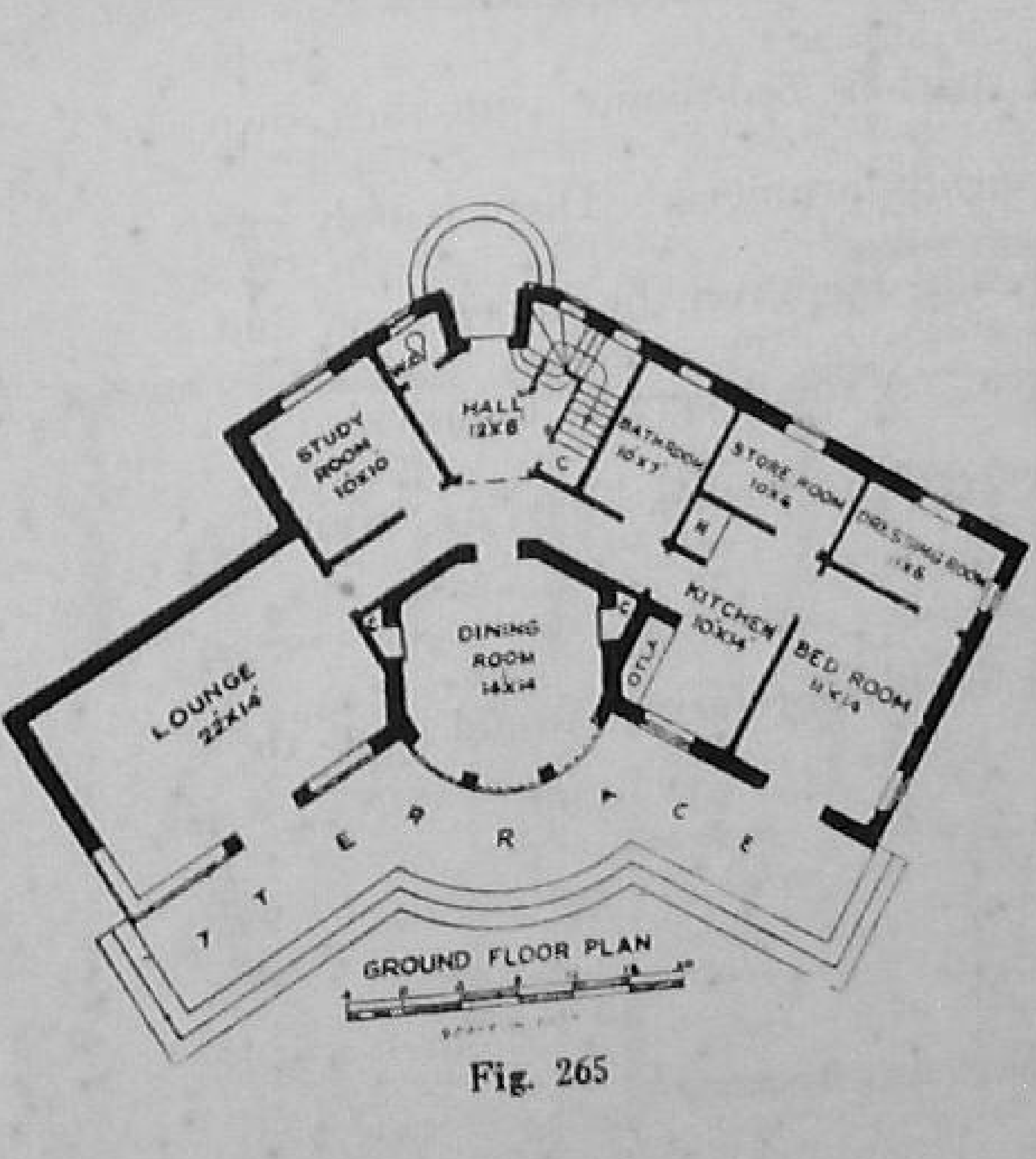


Fig. 265

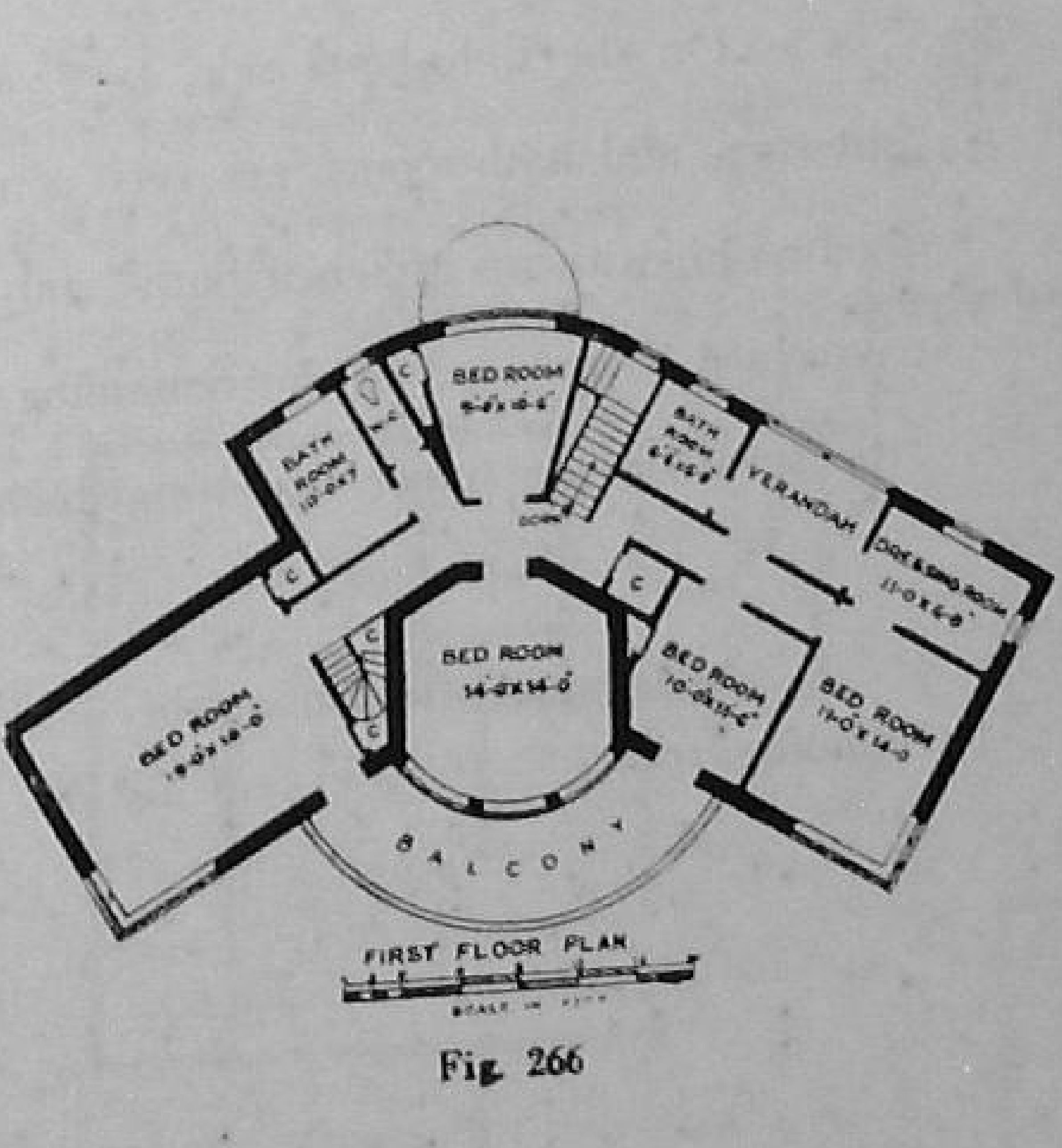


Fig. 266

PLAN NO. 99

Plinth Area: 2,100 sq. ft.

Pre-War Cost: Rs. 17,500

THIS is a typical plan to show how the effect of beauty can be brought to a plain, rectangular structure without any projections or recesses, simply by providing terraces at different levels.

There is an L-shaped verandah on the left-hand side of the entrance, which encloses the drawing-room on two sides. Both the dining- and drawing-rooms are spacious enough. The pantry is very conveniently situated close to the dining-room, and is connected to the kitchen in a separate block on the rear by a covered passage. The staircase hall is just in the centre of the building and can be approached independently from any room. It is separated from the entrance vestibule by a door.

On the right-hand side, two very spacious bed-rooms, with their own dressing- and bath-rooms, are very conveniently arranged. There is only one bed-room, with an attached bath- and dressing-room, on the upper floor, and a terrace is provided in the remaining area. A small pergola is provided on the front on the upper floor on which evergreen creepers may be trained.

As regards orientation, the west or north-west facing would suit the building most.

Fig. 267

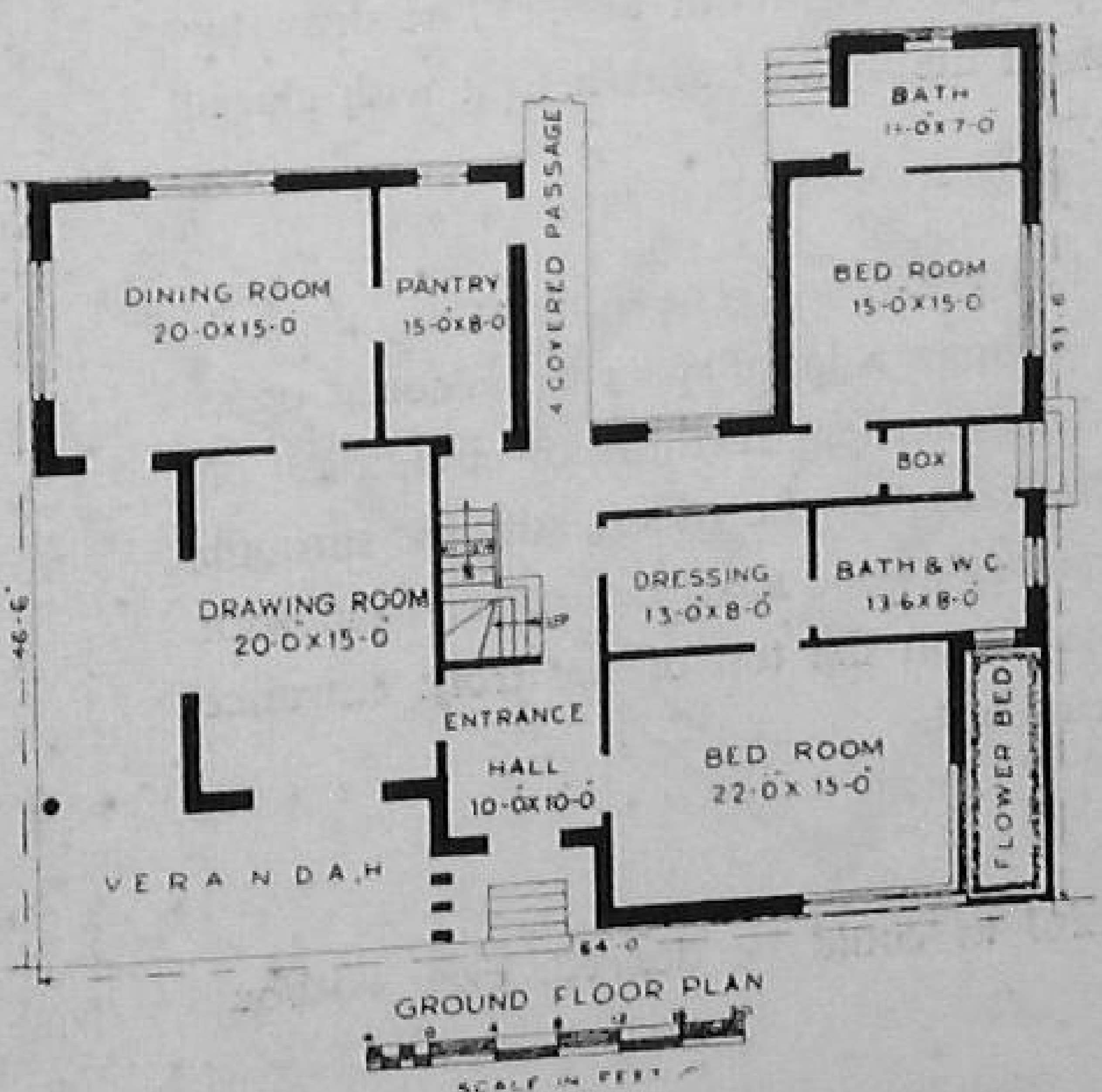


Fig. 268

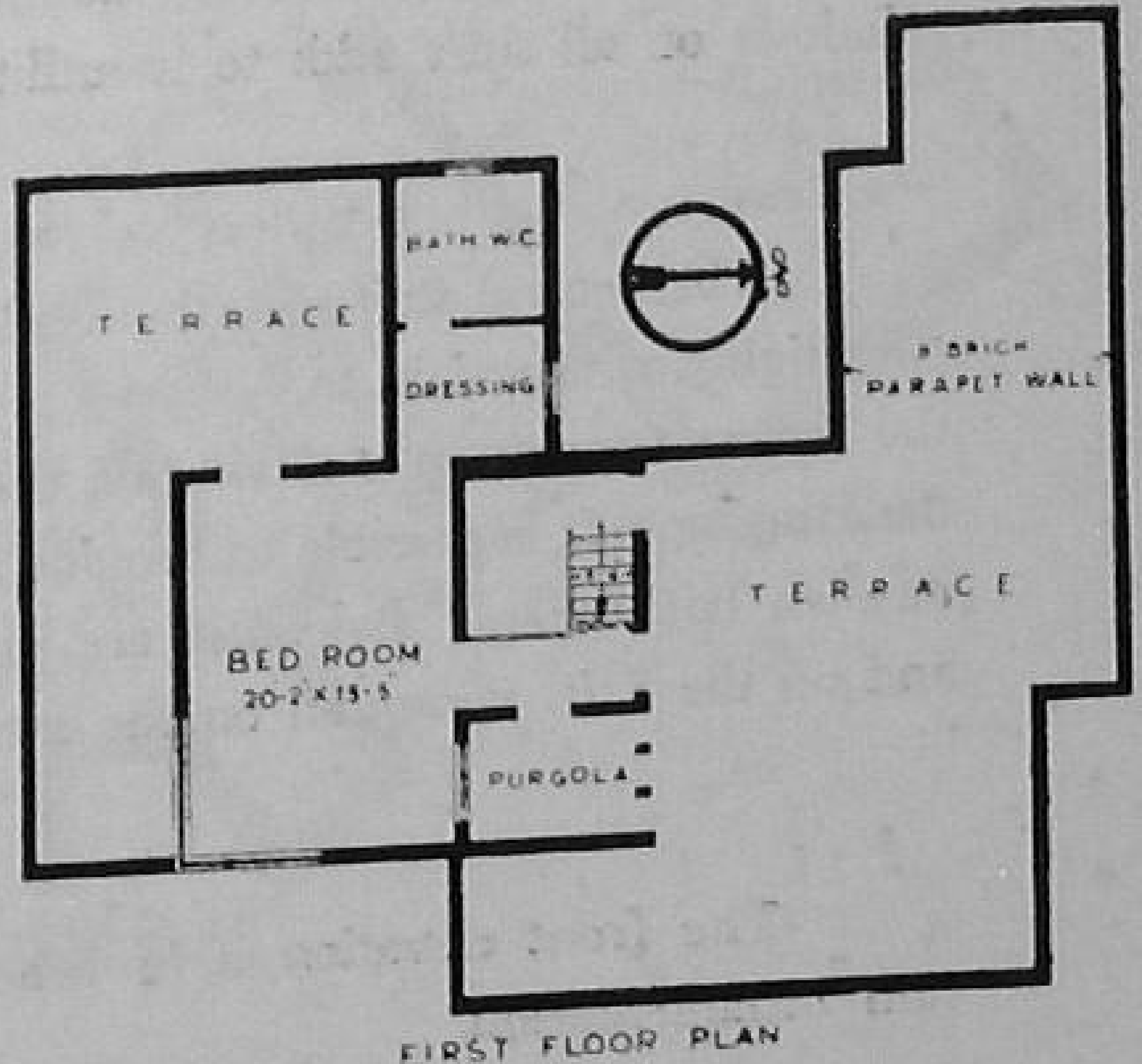


Fig. 269

Architect: G. B. Mhatre, A.R.I.B.A., Bombay.

PLAN NO. 100

Area of Both the Floors: 3,950 sq. ft.

Pre-War Cost: Rs. 18,750

THE plan pictured on the opposite page might properly be called a luxury design; because more attention has been given to providing circulation, rather than to economy, as is evident from the fact that nearly 40 per cent of the space is occupied by verandahs and passages. Except at the extreme end on the right-hand side, where there are two rooms one behind the other, the entire house is one room thick.

On both the sides of the main entrance, there are small cubical spaces for servants to sit in attendance. If a central axis dividing the triangular place at the main entrance into two equal parts be imagined, the block on the right-hand side may be regarded as the ladies' department, in which the common sitting-room would be the ladies' sitting-room. The kitchen, store, and the dining-room are very well grouped together.

In the block on the left-hand side, the good sized bed-room has a bath-room attached to it, though it is the general bath-room also. The drawing-hall is spacious enough and the addition of the 8 ft. verandah to it with glazed windows on all sides adds to its utility.

The central staircase, though it occupies a large space on account of its two flights arranged in a V-shape, provides excellent facilities of circulation on the upper floor from one side of the staircase to the other, straight through the landing. It is possible to provide four very good sized bed-rooms each with its own bath-room. Balconies are provided on the top of the front entrance and on the 8 ft. verandah on the extreme left.

The front elevation is as beautiful as could be desired, even without vain ornamentation.

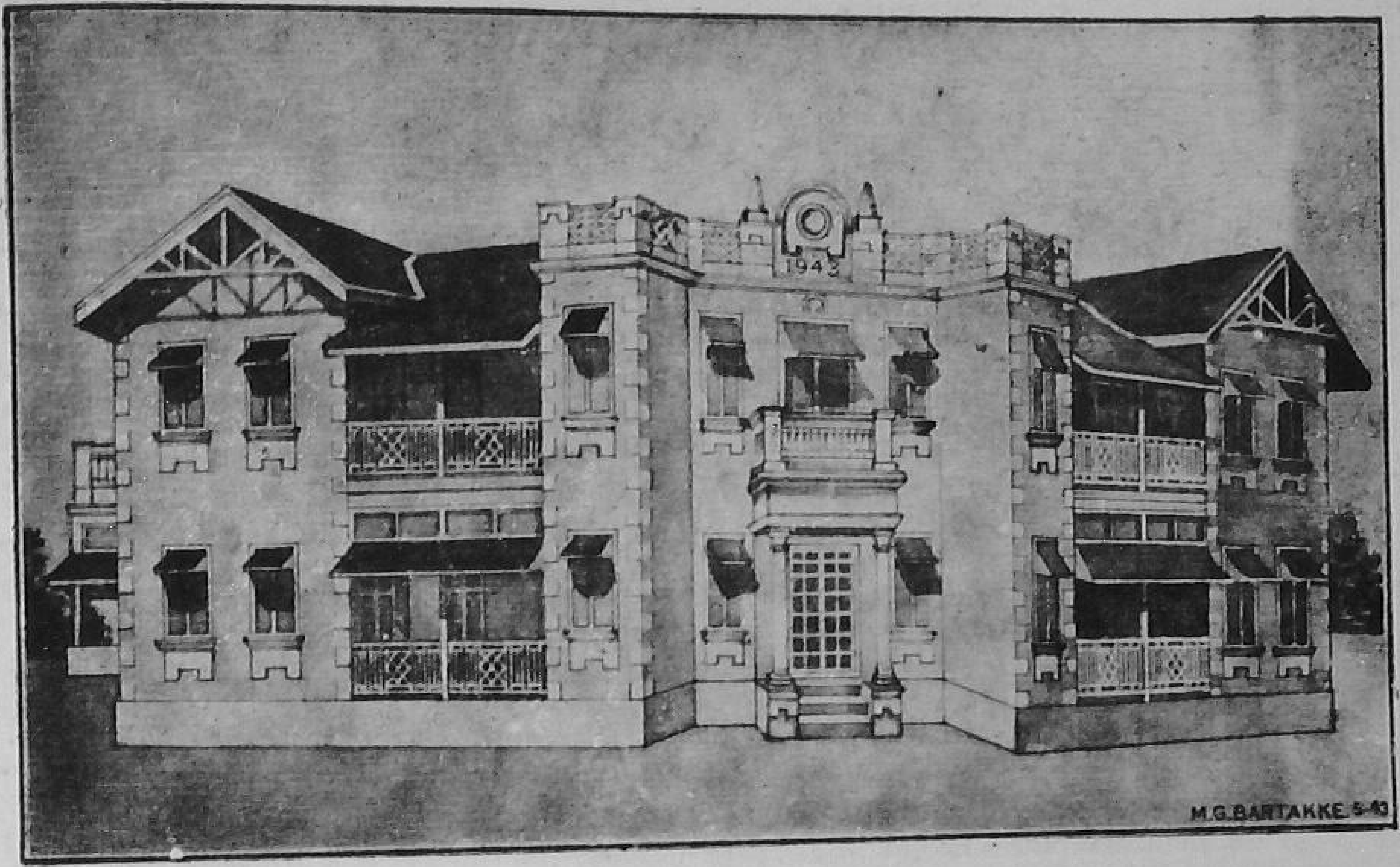


Fig. 270

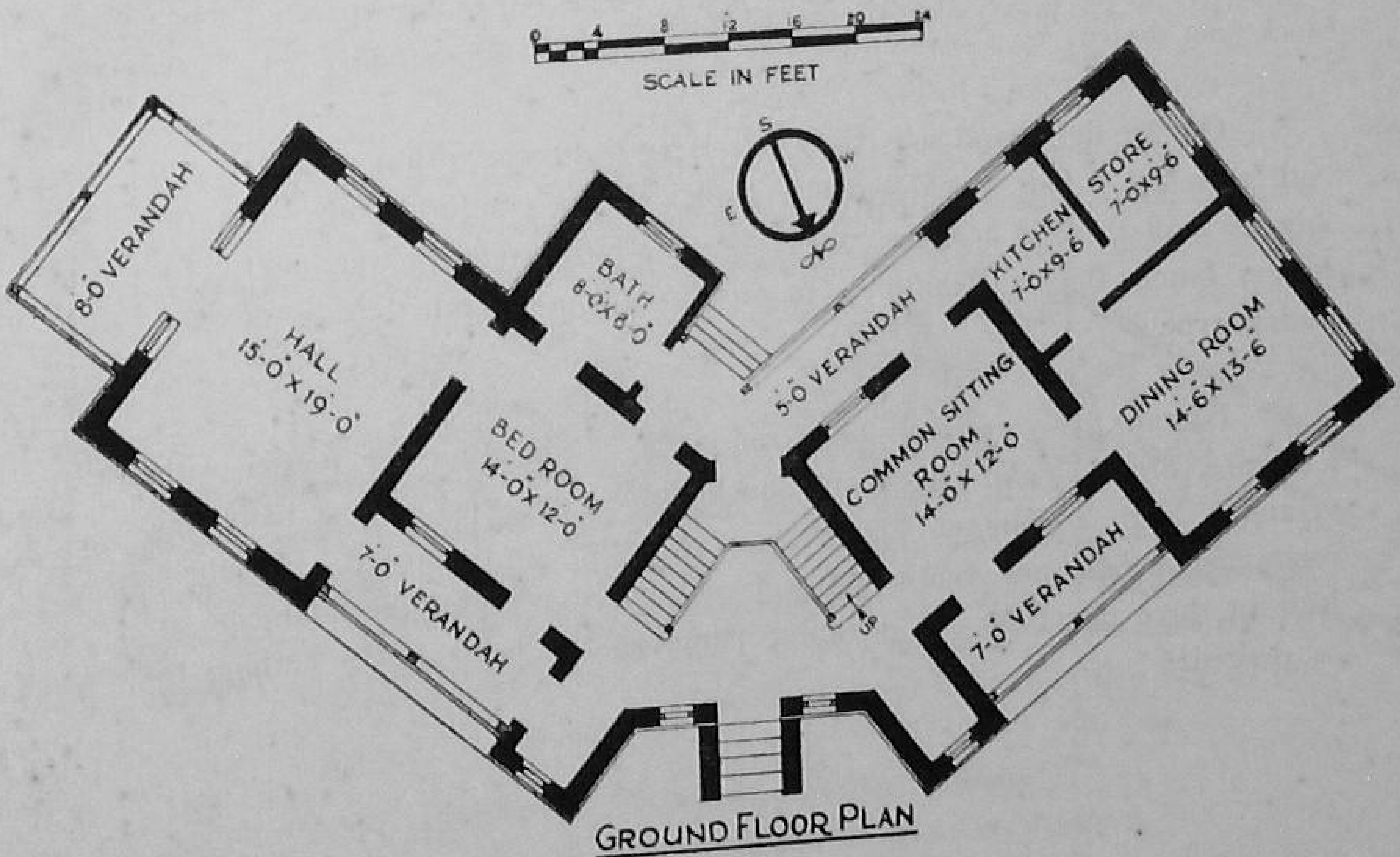


Fig. 271

Architects: M/S. Kamtekar and Bhivandikar, Bombay.
Contractors: M/S. Tendulkar and Patkar, Bombay.

PLAN NO. 101

Area of Both the Floors: 3,420 sq. ft.

Pre-War Cost: Rs. 17,500

THIS is one of the most pleasant and exquisitely beautiful homes, designed specially for comfort. Graceful, sweeping curves and the central turret give it an air of domesticity. Though an asymmetrical design, there is a perfect balance and proportion in it. The home faces the north-west.

A flight of steps, with concrete flower-boxes on either side, leads one to the charming, circular entrance-hall which provides four different outlets, one just opposite to the staircase. The latter is treated as the central feature in the staircase hall. On the left hand, there is an entrance to the spacious semi-circular drawing-room, which commands an excellent view of the front garden through the large window. Behind the drawing-room is placed a large dining-room, and between these two rooms is a partition which slides into the recesses of the wall and opens both the rooms into one large congregation hall on special occasions. The quarter-circular verandah, adjoining both these rooms, further adds to this space. The pantry connected to the separate kitchen block (not shown) by a covered passage is close to the dining-room.

On the right-hand side, there is a large bed-room with a verandah and bath attached. This would serve as an excellent "comfort room." In the staircase hall there is a closet called "Box," which would be very useful for storing family linen. Behind it, in an inconspicuous corner, is a w. c. of Indian type.

Upstairs, two excellent bed-rooms—one of them for the master with a terrace, dressing- and bath-room attached, and the other with a bath and verandah, with a common lounge between them—are arranged. All these rooms derive light and ventilation and command a view of the landscape at least in three directions. A veritable paradise—the home leaves nothing to be desired!

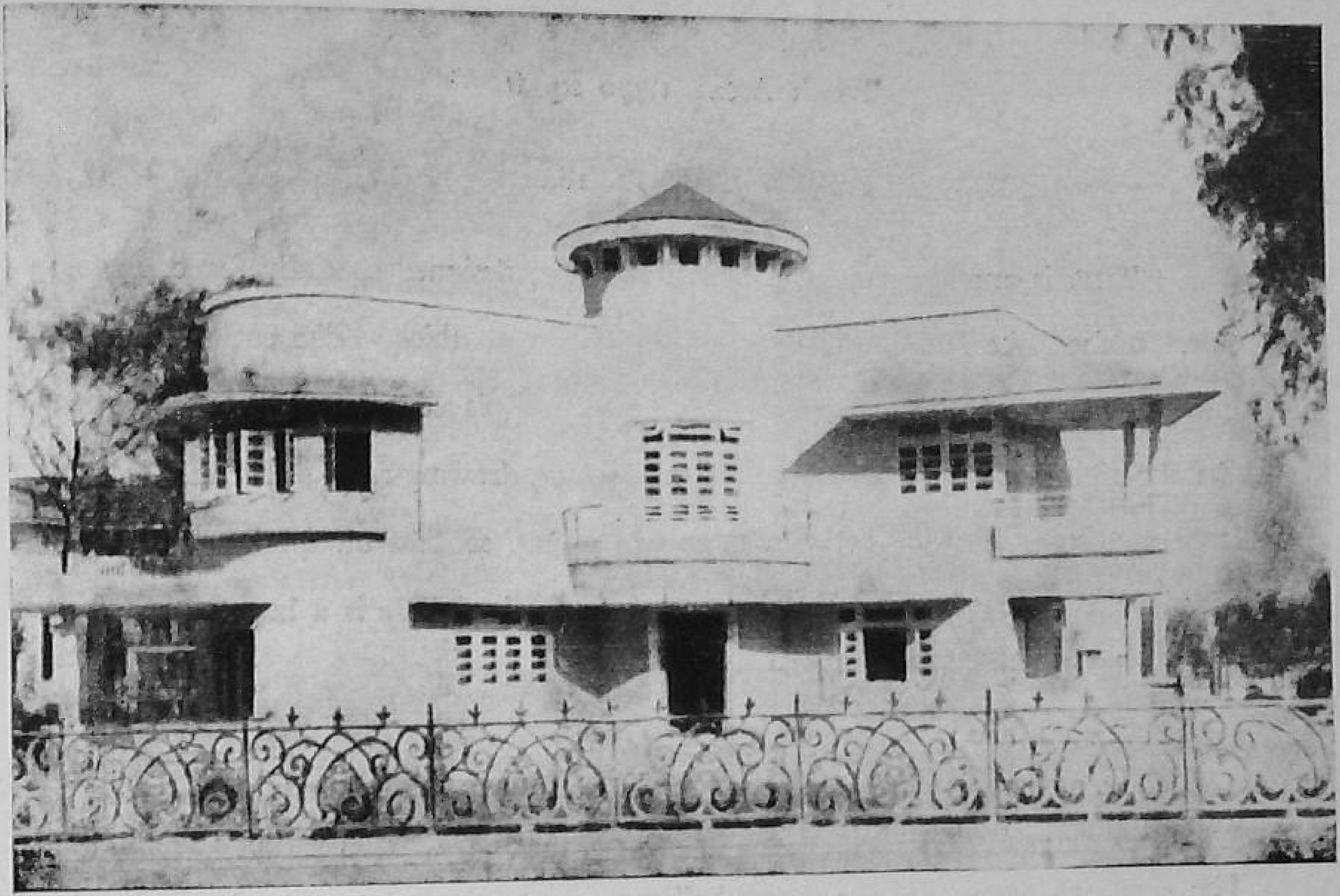


Fig. 272

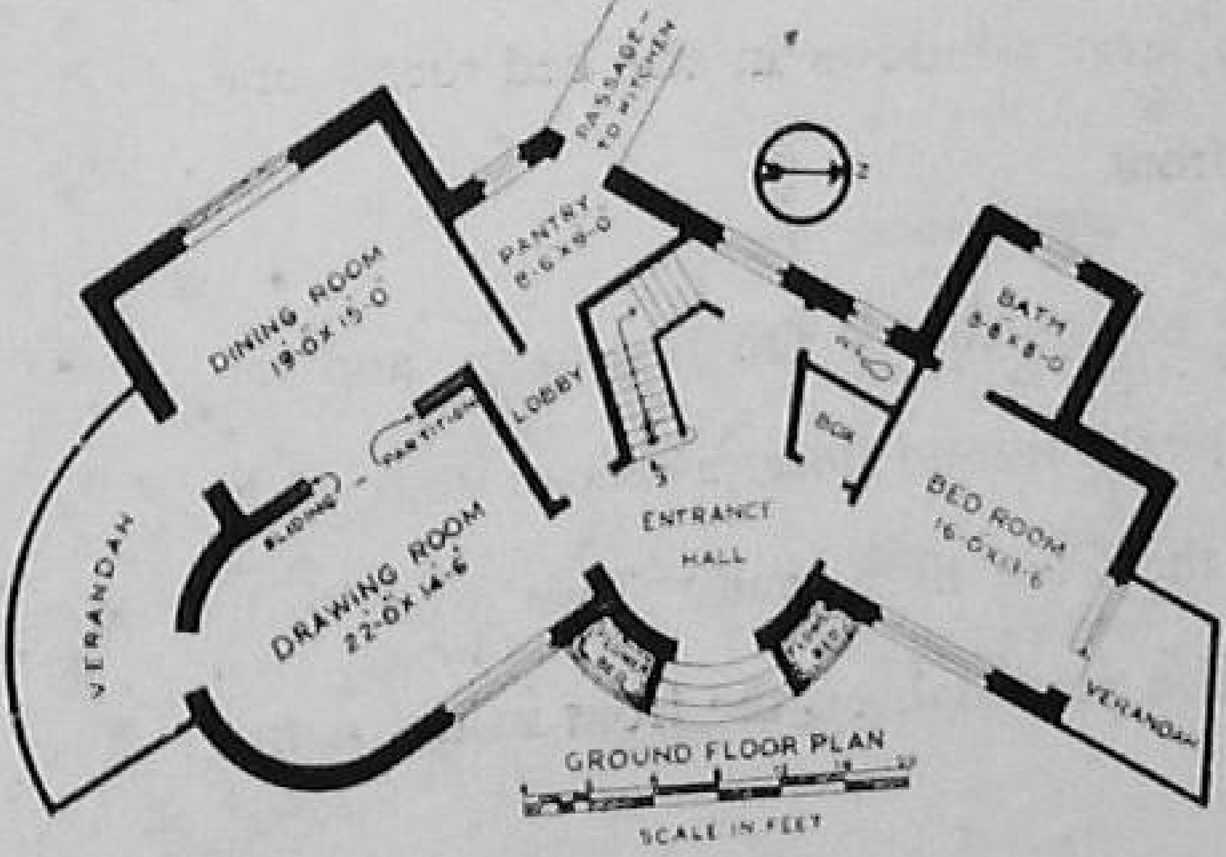


Fig. 273

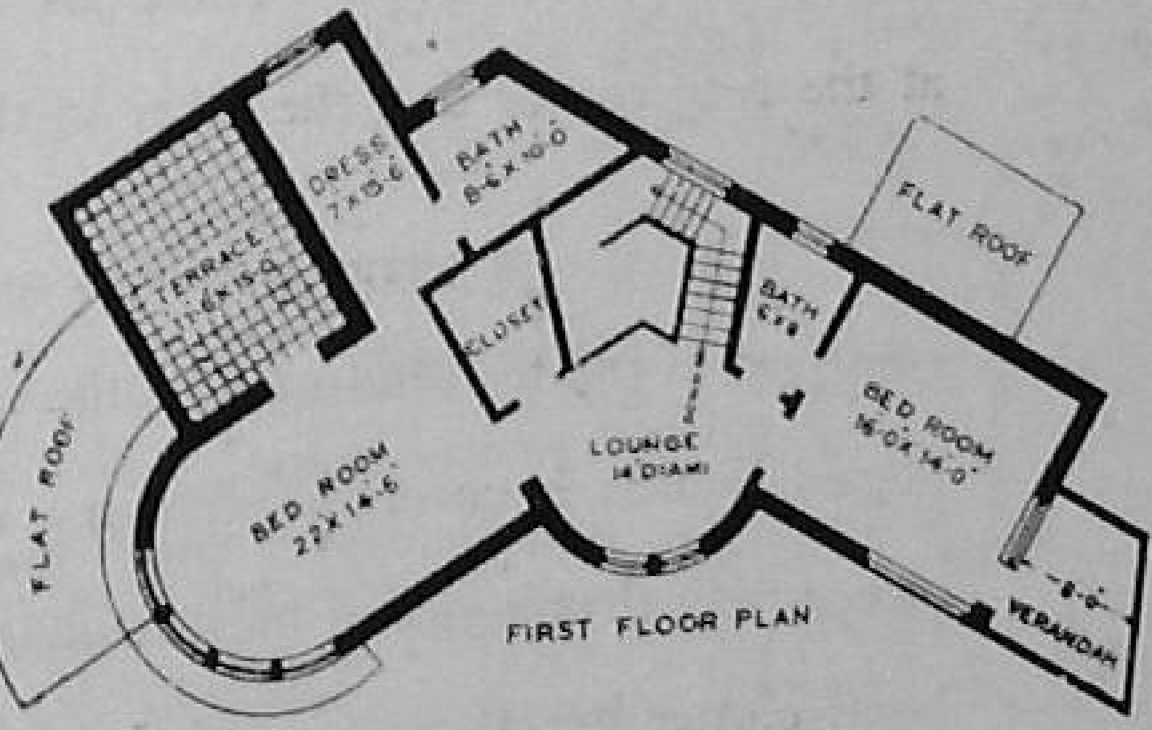


Fig. 274

Architect: G. B. Mhatre, A.R.I.B.A., Bombay.

PLAN NO. 102

Plinth Area: 1,770 sq. ft.

Pre-War Cost: Rs. 18,000

THIS is another plan of a beautiful home, designed specially for comfort. It faces the N.-W. and is practically one room thick. The entrance is into the staircase hall, on the rear side of which is plaçed a circular staircase. On the right-hand side of the hall is a spacious drawing-room. There is a large opening 7 ft. wide between these two rooms, so that on special festive occasions, they can be combined into one large hall. There is a large corner window in the drawing-hall which adds to the elegance of the front elevation.

The verandah in the front on the extreme right-hand side, open to the western breeze, would be most enjoyable. Behind it is a large dining-hall. The verandah opens into the dining-hall through an 8 ft. wide opening. The pantry is placed very conveniently by the side of the dining-room and is connected to the kitchen block on the rear side by a long, covered passage.

On the left side of the staircase hall, is placed a large bed-room with an attached bath-room. There are two large windows in the bed-room, one at the rear corner and the other in the front.

Upstairs, a terraced roof is made on the top of this bed-room, and for going up to the terraced roof on the top of the second floor, a special staircase is placed, which is covered from view on the front by a wall. Two other bed-rooms with dressing- and bath-rooms, and a verandah on the front in the right-hand corner have been provided.

Thus, the home is very attractive to look at and very comfortable to live in.

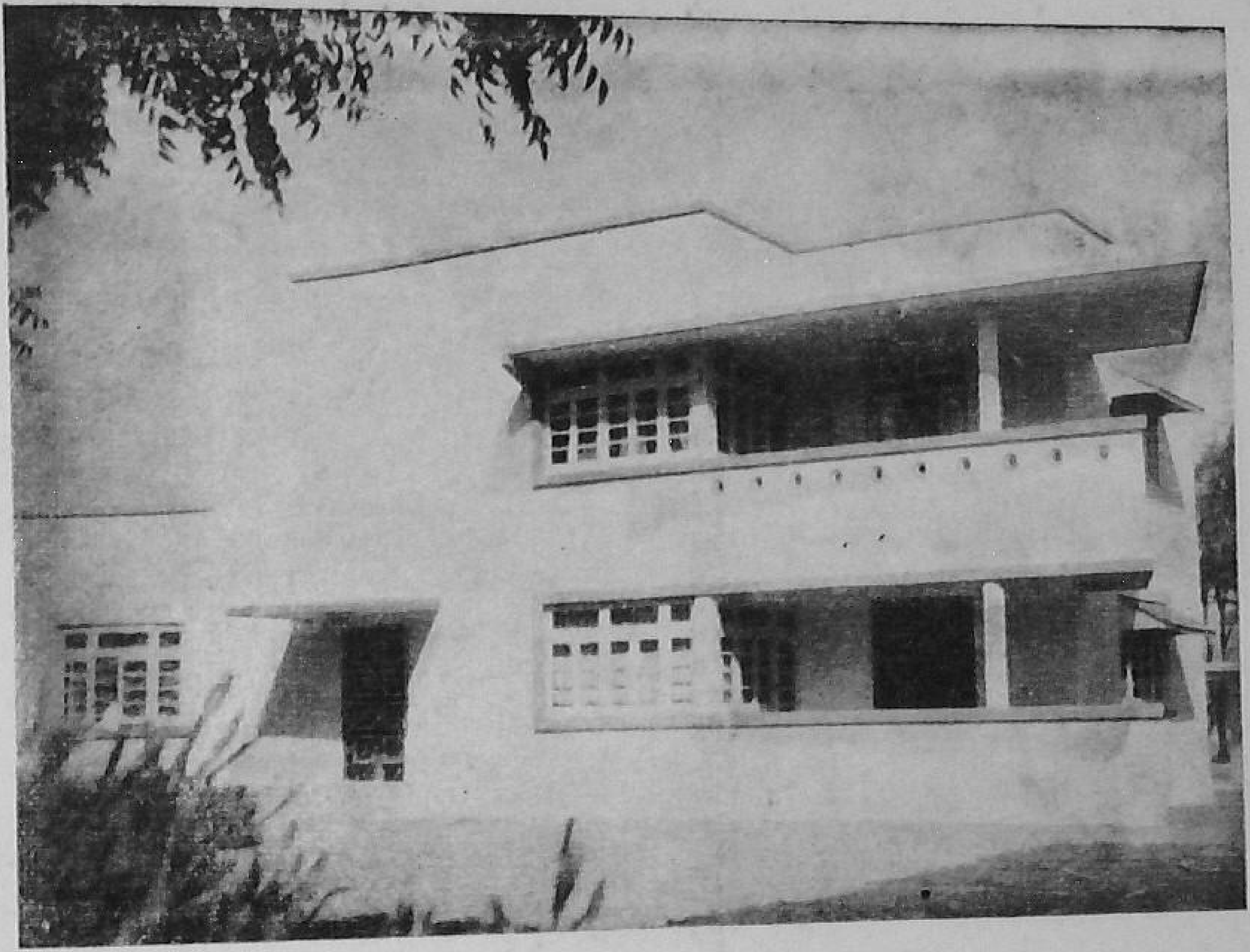


Fig. 275

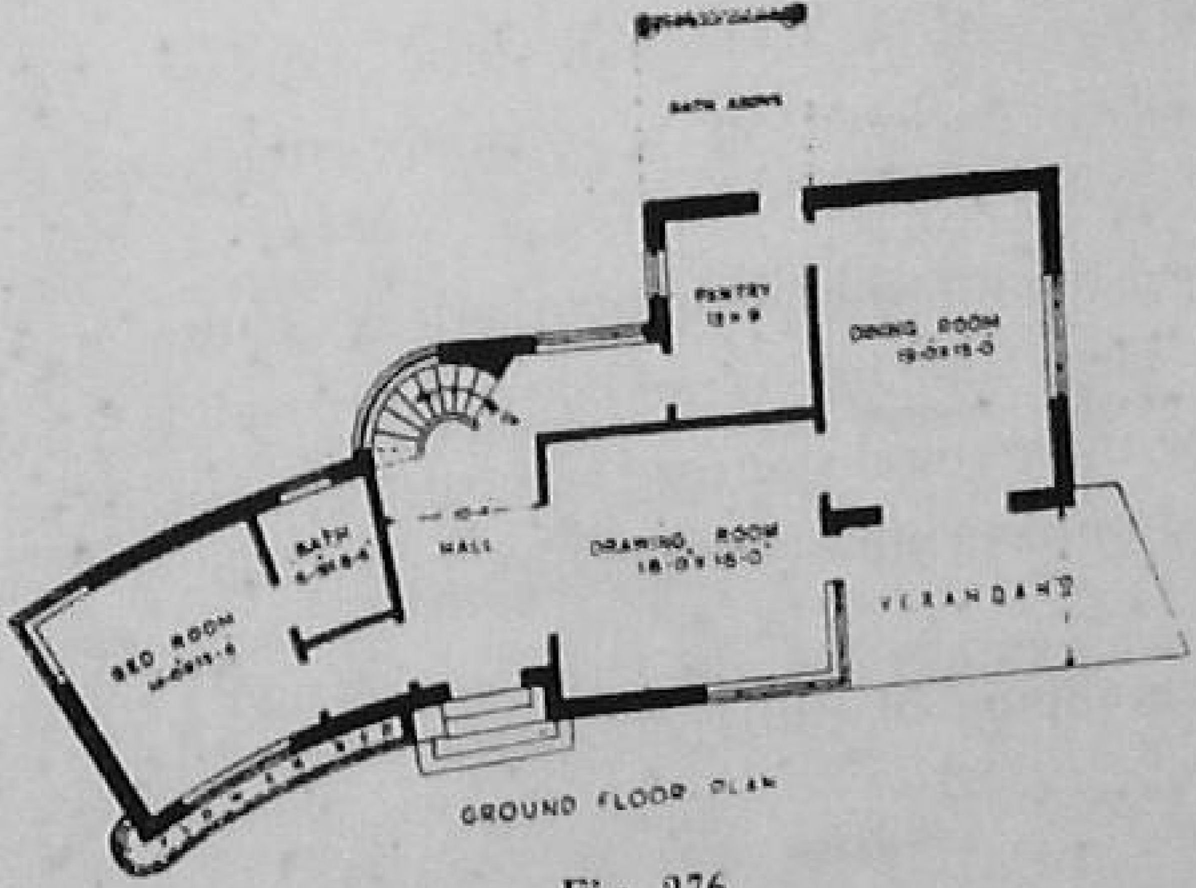


Fig. 276

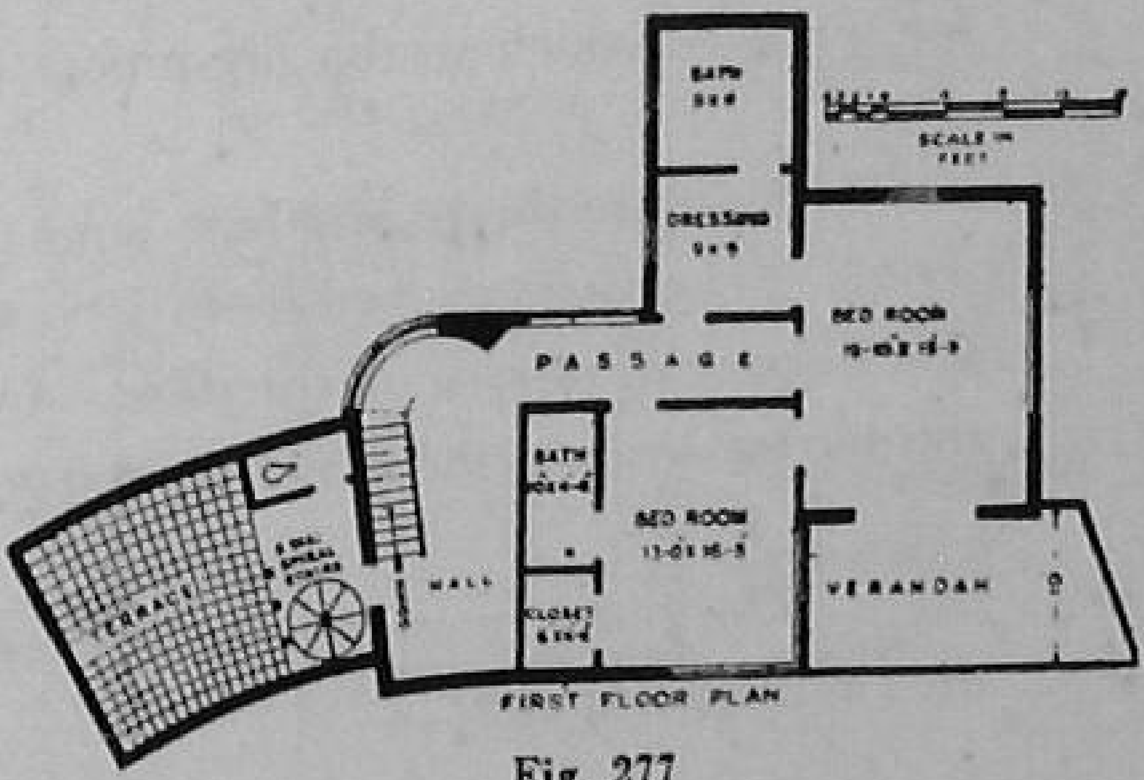


Fig. 277

Architect: G. B. Mhatre, A.R.I.B.A., Bombay.

PLAN NO. 103

Plinth Area: 2,807 sq. ft.

Pre-War Cost: Rs. 24,800

THIS is one of the most cleverly designed, excellent plans with a number of distinctive features which mark it as the abode of people of taste and refinement. It combines all the elements which go to make a house a pleasant, comfortable and healthy home.

The entrance leads to a spacious verandah on the left-hand side and a curved vestibule with a large window on the right-hand side. The latter would be very useful as a waiting-room. The spacious drawing-room is in the centre and, as the equally large dining-room and the verandah in the front are joined to it with a number of large openings, all these three apartments form, as it were, parts of one big hall for use on special occasions. The kitchen is best situated in the N.-E. corner on the rear side, separated from the important living-rooms by the scullery, pantry and passage. The store-room is very conveniently placed with respect to the kitchen.

The straight passage in front of the entrance has separated the bed-room block as strictly private. The bed-rooms are spacious and provided with their own bath-rooms and a spacious common verandah with an independent exit through it. The staircase is so situated that it is easily and independently accessible from any room. The space below the upper flight of stairs is converted into an additional store-room. There is a second small spiral staircase for servants, which is also fire-proof, and is enclosed in a separate cubicle.

Upstairs there are three large bed-rooms with their own private bath-rooms. The master's bed-room is very large and has verandahs on two sides and a spacious terrace on the third. One more spiral staircase, also enclosed, on this terrace leads to the top of the flat roof on the entire building.

The home possesses the best of grouping of different apartments, and the circulation is ideal.

The elevation is also very attractive, so the home leaves nothing to be desired.

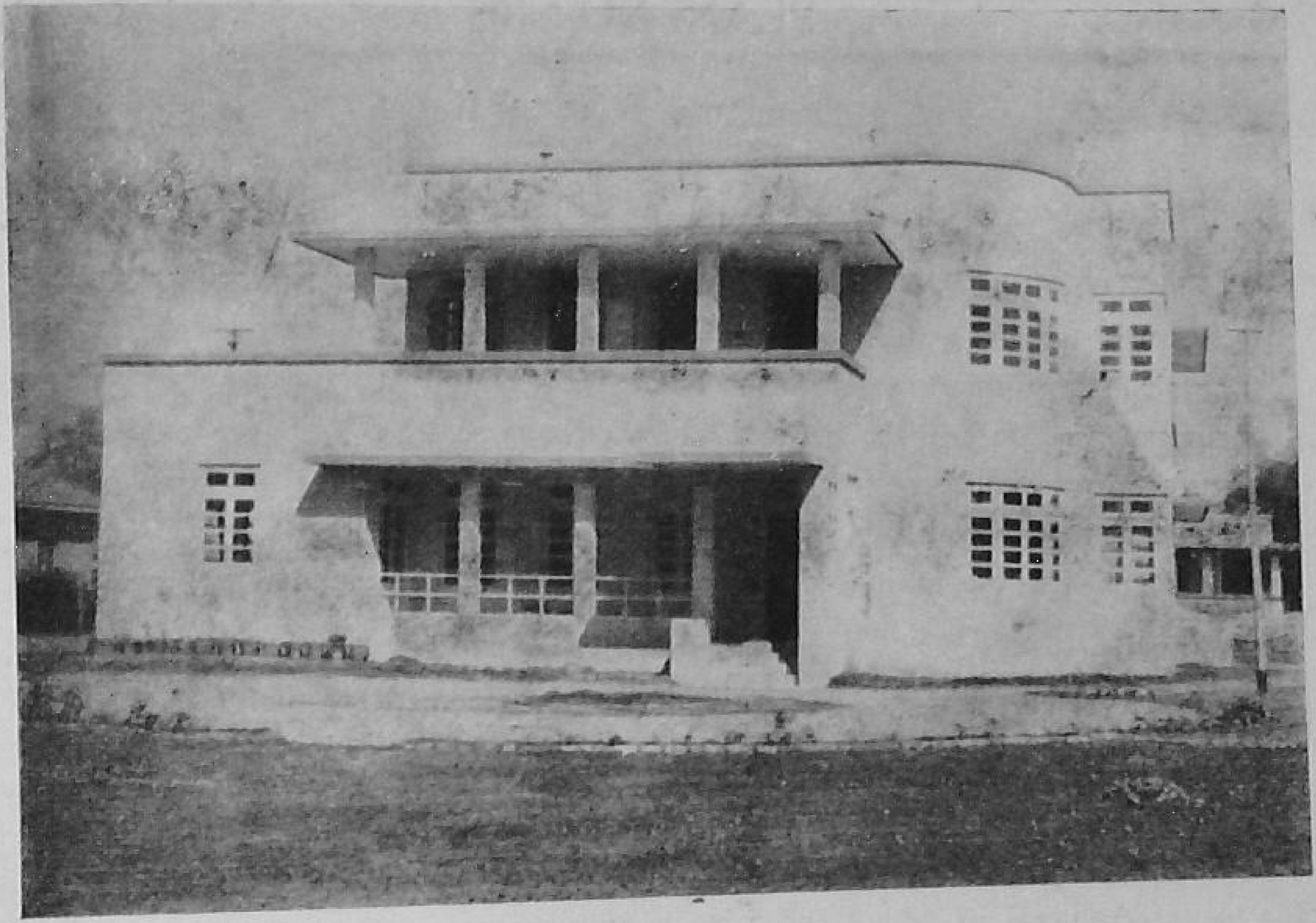


Fig. 278

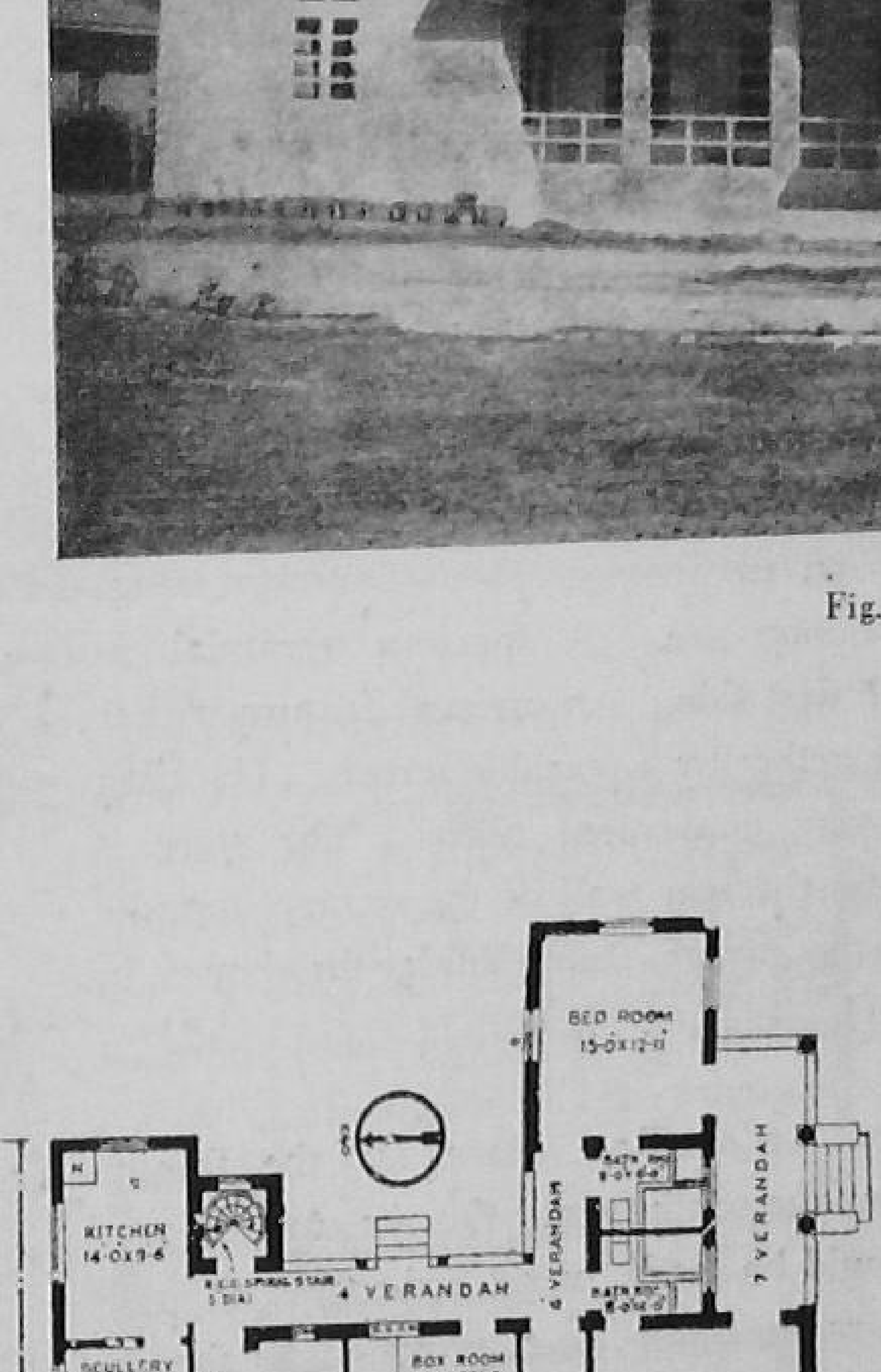


Fig. 279

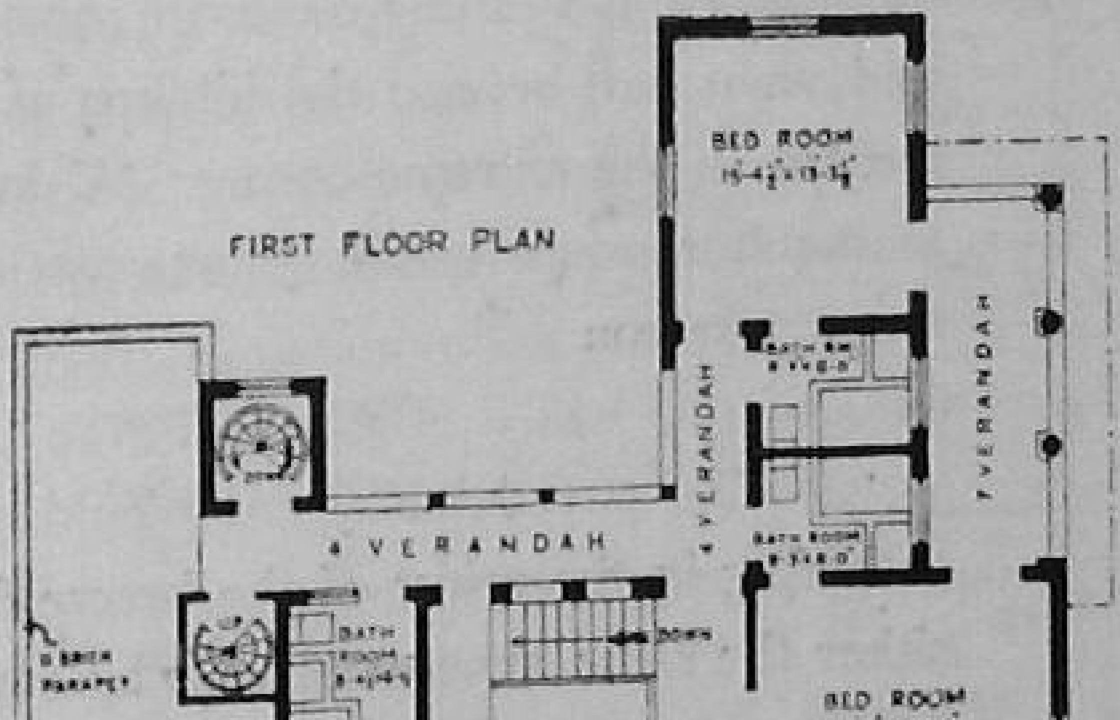


Fig. 280

Architect: M/S. Bhedwar and Bhedwar, Bombay.

PLAN NO. 104

Floor Area: 6,540 sq. ft.

Pre-War Cost: Rs. 25,400

THE solid, stone facing, bold, prominent projections, sweeping curves, etc., of the house and garage ensemble, represented by the plan here, carry an air of strength and stability about them, indicating that the house is built for permanence. It faces the east and is of a U-shape, so as to expose the maximum surface to the south-western breeze. It is a house practically one room thick, and that room also is protected by a verandah on the south and west. A very well considered design, indeed.

There is a paved terrace in the front, from which one enters into a semi-circular vestibule. The latter opens either into the drawing-room or the lobby of the staircase, leading to the upper floor. This arrangement would permit either of the two floors being treated as an independent flat.

A ladies' apartment and a bed-room are arranged in the southern wing, with a bath-room between them for common use. A spacious verandah is provided behind the drawing-hall on the west side. An unusual feature is that the kitchen and dining-room are joined together by a portable screen. The bath and W. C. are beyond the kitchen at a very convenient place. The store is located in the extreme corner. A door in the rear wall of the garage opposite to the store-room would allow entering the garage from inside the house in the wet season.

The paved back-yard would prove an excellent place for the family gathering in the midst of the breeze from the south-west. On the upper floor, either the same arrangement as below could be made, or six bed-rooms, a large drawing-room, two verandahs, two bath-rooms and a W. C. provided, as shown on the plan. A 6 ft. wide balcony is projecting in the front, which has further increased the utility of the house.

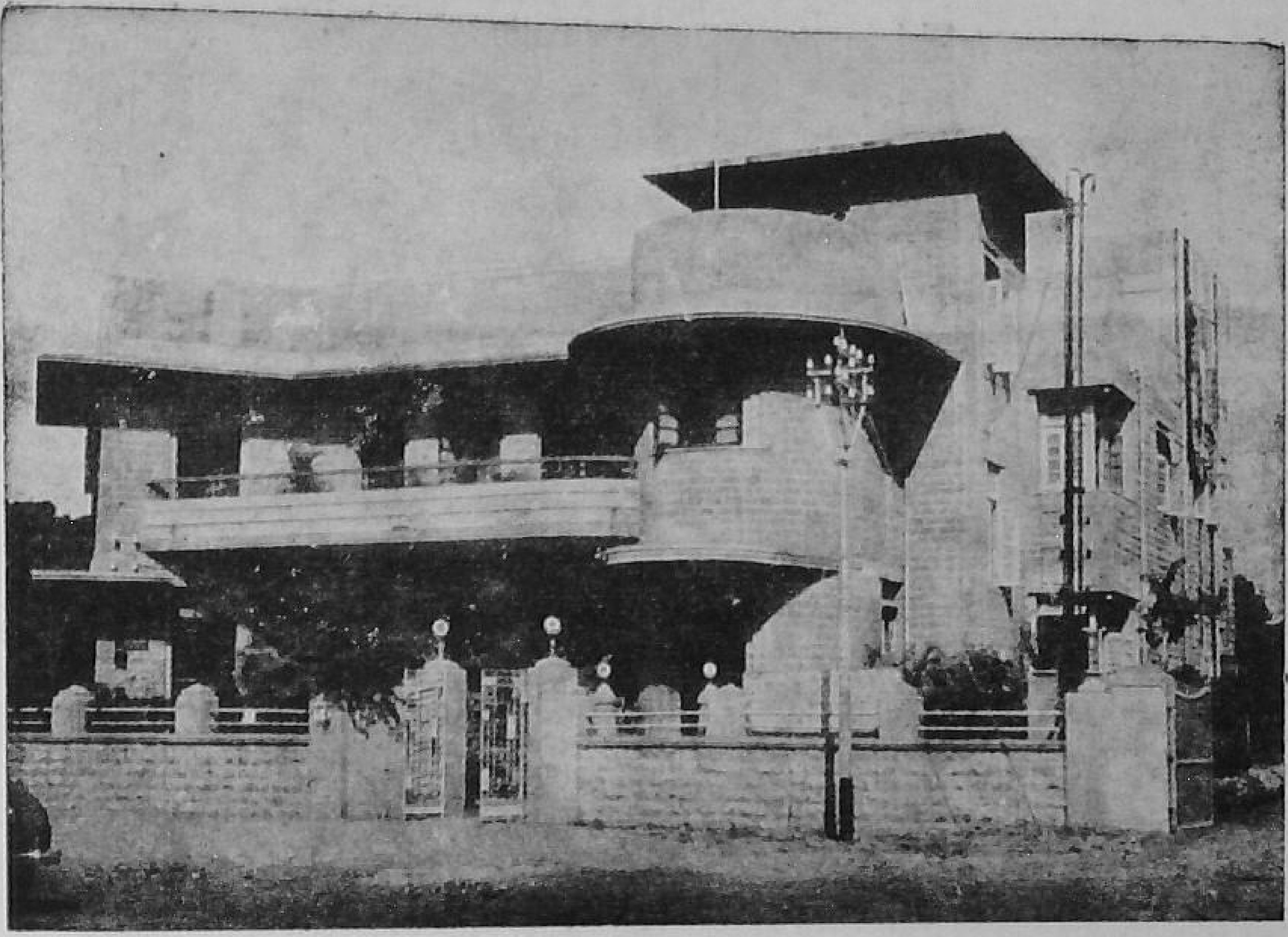


Fig. 281

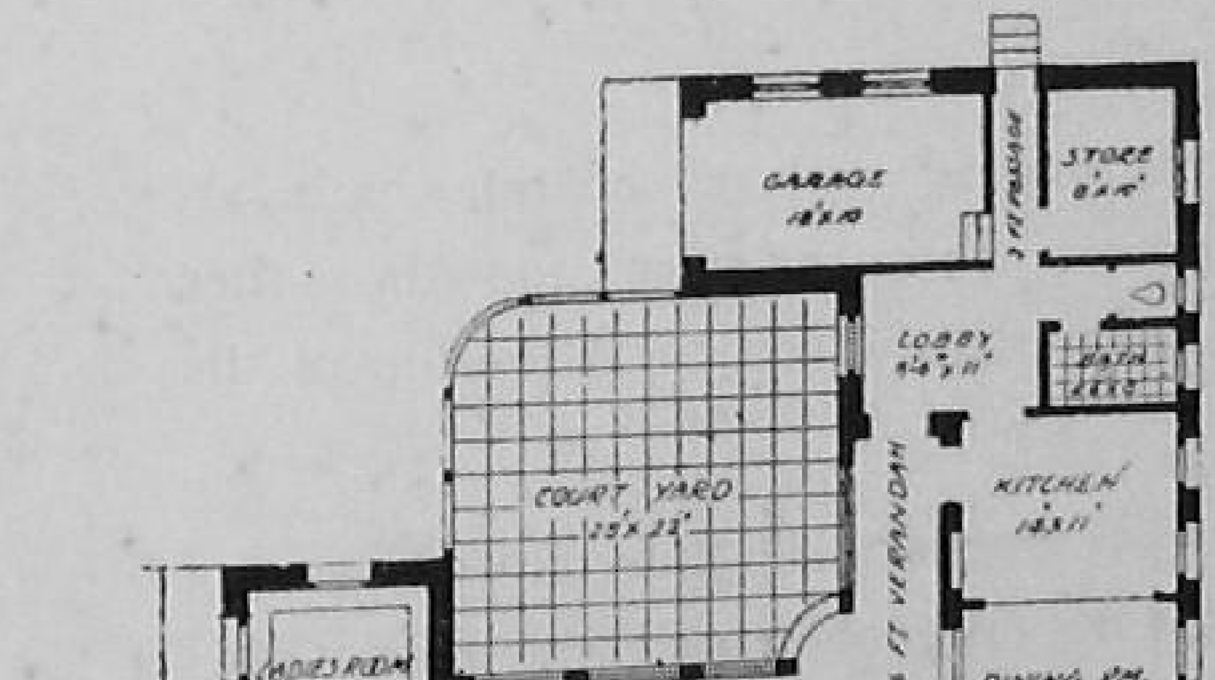


Fig. 282

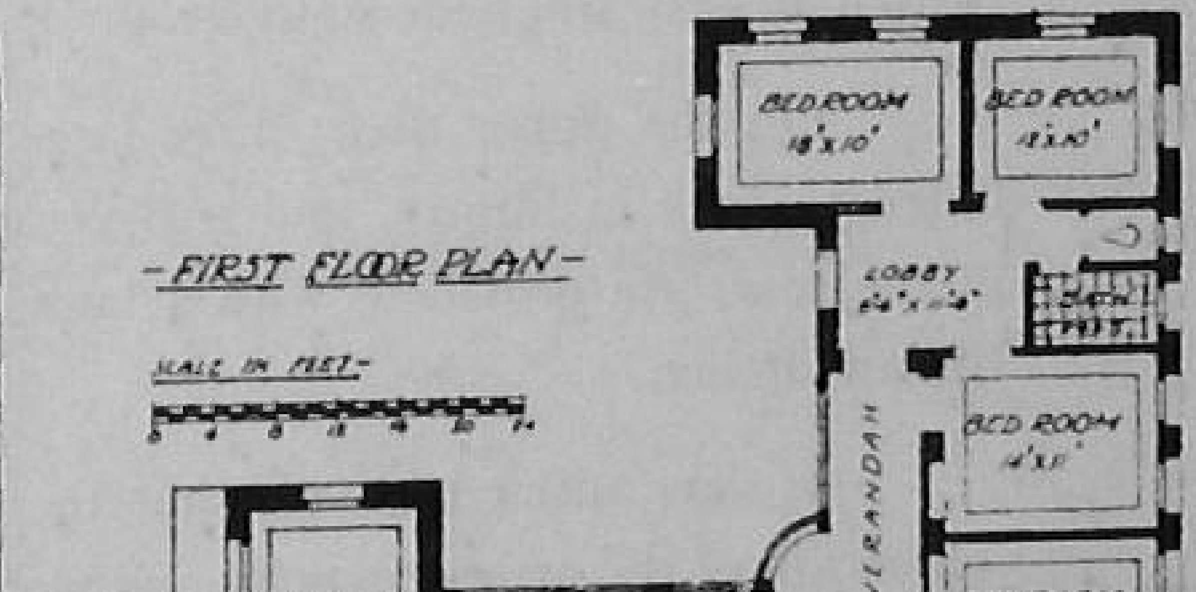


Fig. 283

Architects: Master, Sathe and Bhuta, Bombay.

PLAN NO. 105

Floor Area: 6,042 sq. ft.

Pre-War Cost: Rs. 28,200

THIS charming villa has many unique features. The corners are rounded, which lend grace to the elevation. It is built of brick-in-lime, rendered on the outside with colorcrete cement of pale cream shade. It has a flat roof, which can be used as a promenade to take advantage of fine views. The front entrance faces the west, so that the dining- and drawing-rooms on the ground floor, and the two bed-rooms above them on the upper floor, are very well protected from the hot breezes. The entrance opens into a verandah 10 ft. wide, on the right-hand end of which there is an office room. The dining- and the drawing-rooms, which are quite spacious, are treated as formal apartments and are separated by a corridor from the wing on the right-hand side. There is a spacious bed-room provided in the wing, behind the office room, with its own dressing- and bath-rooms and a W. C., and behind it are placed a store-room, an Indian kitchen, bath, and a washing-place, etc., suitable for the Indian manner of living. On the left-hand side, behind the dining-room, is provided an English pattern kitchen, with a pantry attached to it. There is a very wide verandah on the rear side, in which, at one corner, is located an easy and wide staircase.

On the upper floor, three large bed-rooms, with a separate bath allotted to each, a library, and two verandahs, one in the front and the other in the rear, are provided, with a large terrace in the corner on the top of the Indian kitchen.

It very often happens that there are guests to be entertained, some of whom are of the orthodox type, and would not even touch food which is not only strictly vegetarian, but also cooked by persons in the orthodox manner, after bathing and dressing themselves in sacred silk garments. The English kitchen, therefore, is placed at the extreme opposite end, far removed from the Indian kitchen.

This is one of the most efficient and practical designs of large houses, built for comfort. The elevation is effective by the simple and plain surface of the walls. The wrought-iron grille of a simple, decorative design in the midst of a plain concrete parapet wall heightens the effect. The interior is most tastefully decorated and furnished, and there is an artistic setting of a very beautiful landscape garden provided, which forms an integral part of the design.

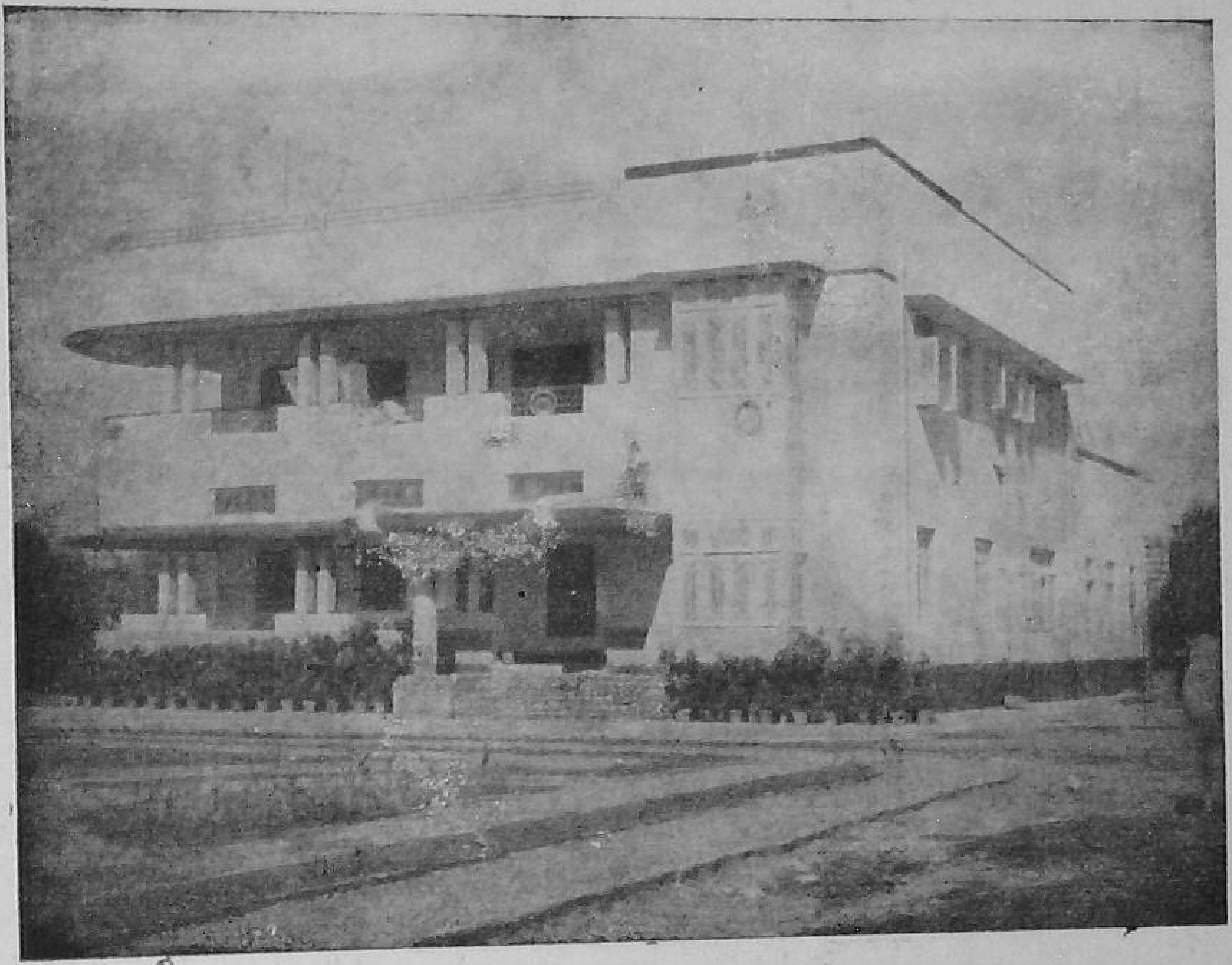


Fig. 284

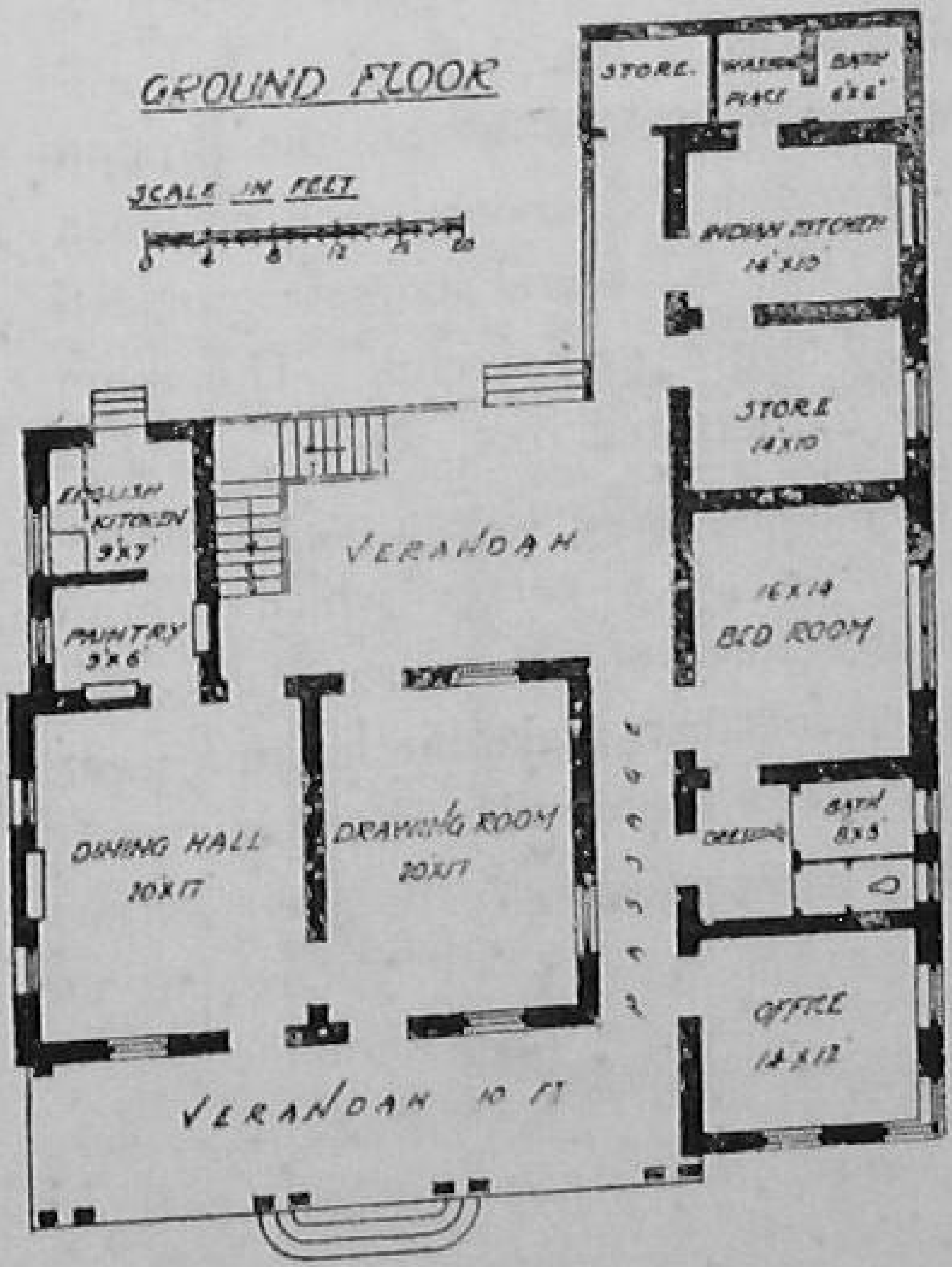


Fig. 285

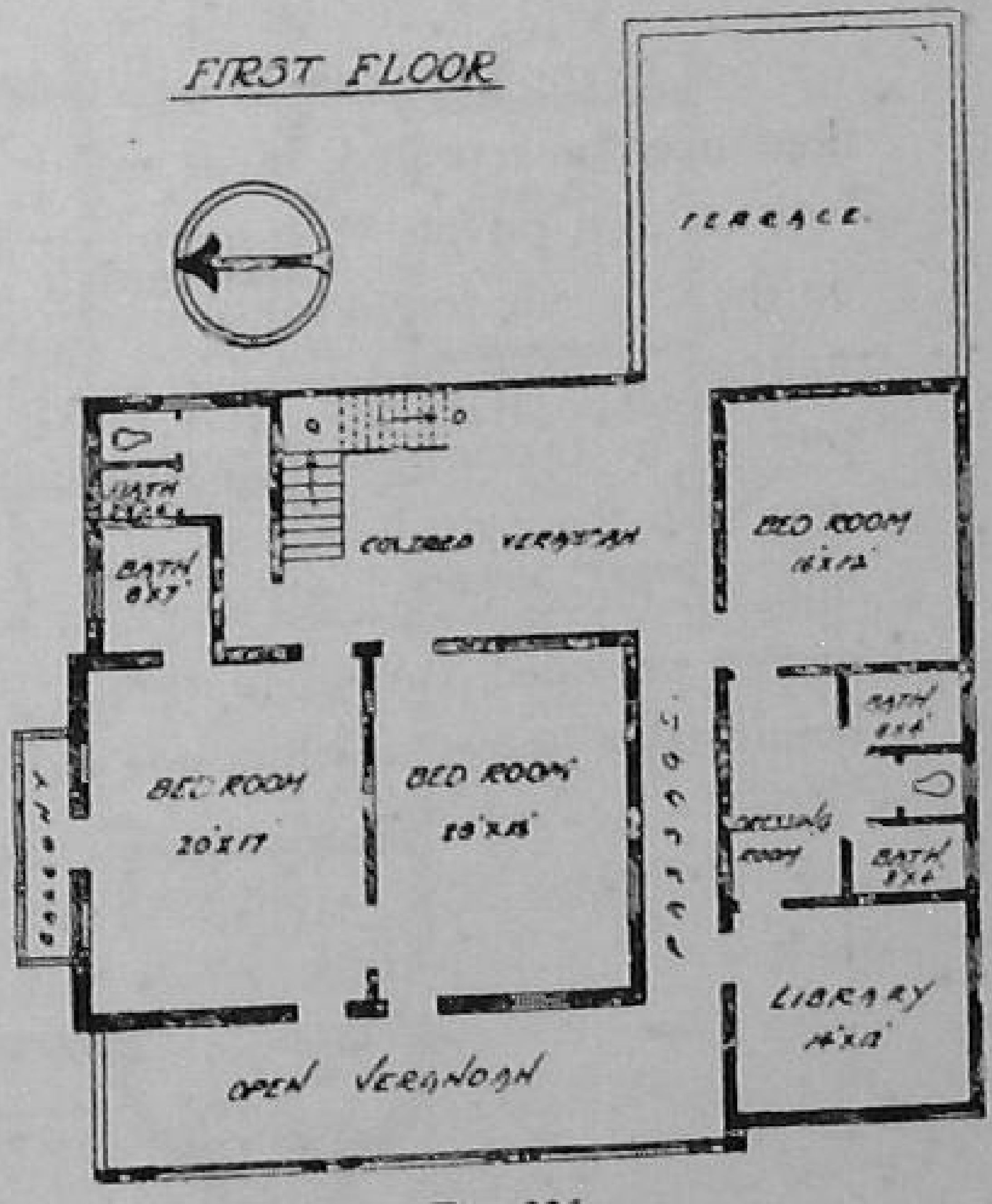


Fig. 286

PLAN NO. 106

Floor Area: 6,104 sq. ft.

Pre-War Cost: Rs. 28,400

THIS is another plan of an efficient and effective design of a large house. The exterior, with the sweeping curves of the *chhajjahs* and rounded corners, the well-thought-out fenestration and balanced proportions, gives it a special distinction. The added height of the staircase room lends dignity to the vigorous design.

The planning of the interior also provides for the highest degree of comfort. The house has the main front on the south side. The wide entrance opens into a curved verandah, 7 ft. wide. The staircase is so placed and provided also with an independent entrance from the outside, that either both the floors could be used together by the same family, or they might be separately occupied by two different families. A large, combined drawing- and dining-hall is centrally placed with a pantry room opposite to it, and two spacious bed-rooms are arranged on two sides, provided with their own private bath-rooms. The store-room, kitchen and the servants' room are placed in an attached wing. The bed-room on the left-hand side, which is open to the full south-west breeze, and which commands a wide outlook, swinging round from north to west, is the most delightful room in the whole house.

On the upper floor, either the same suite of rooms as on the ground floor may be repeated, or as many as six excellent bed-rooms, each provided with its own private bath-room, arranged. There is a spiral staircase provided on the rear side for servants, which is sure to prove very useful. The main staircase is continued to give access to the flat-terraced roof, which is waterproofed by taking special precautions. The small building, seen in the photograph on the right-hand side of the main house, is a garage which is also built on modern lines. There is a beautiful setting of an artistic landscape garden provided. All these things, combined together, make the house a most comfortable home, which is sure to be the pride of the dwellers inside.

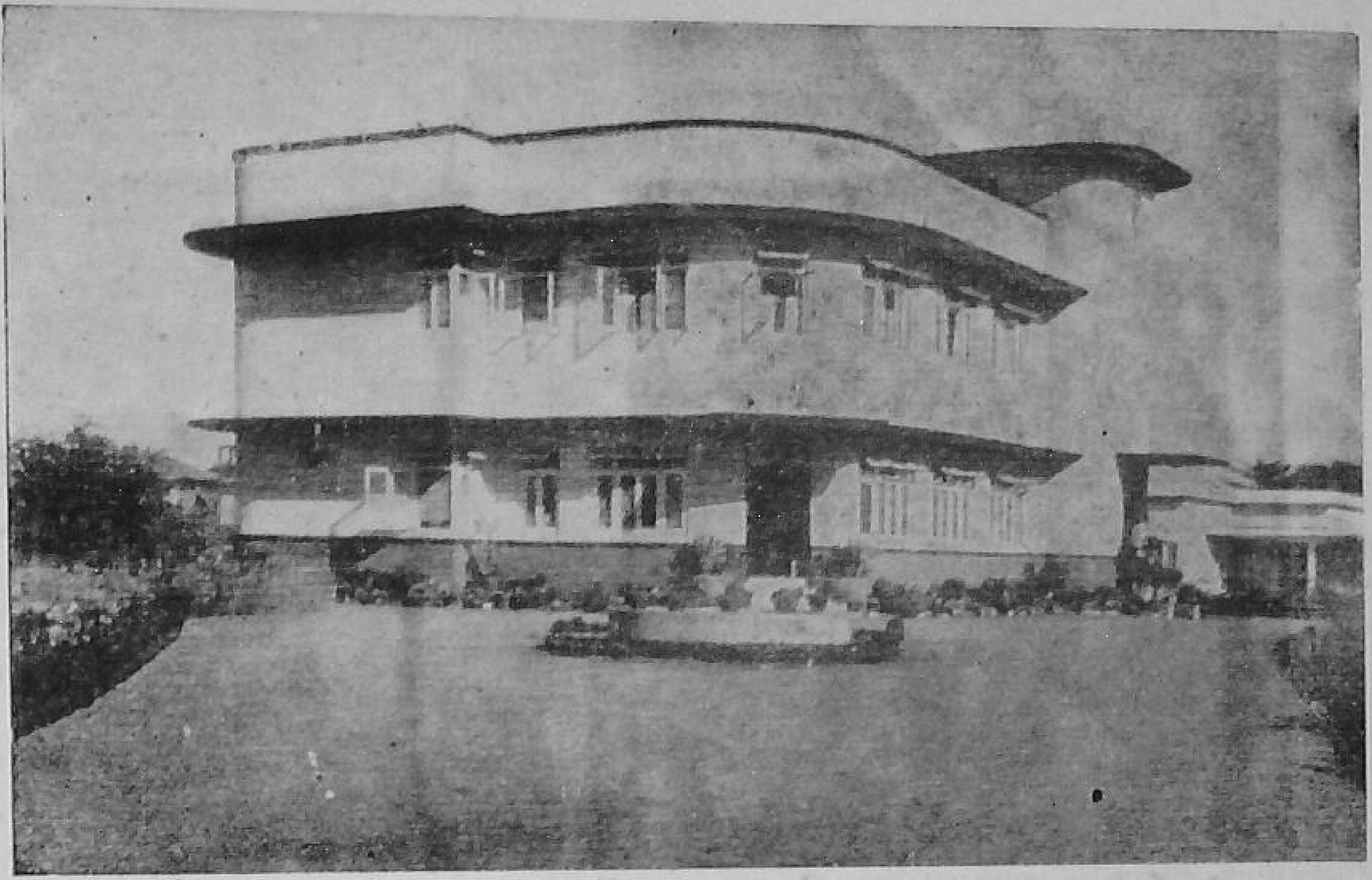


Fig. 287

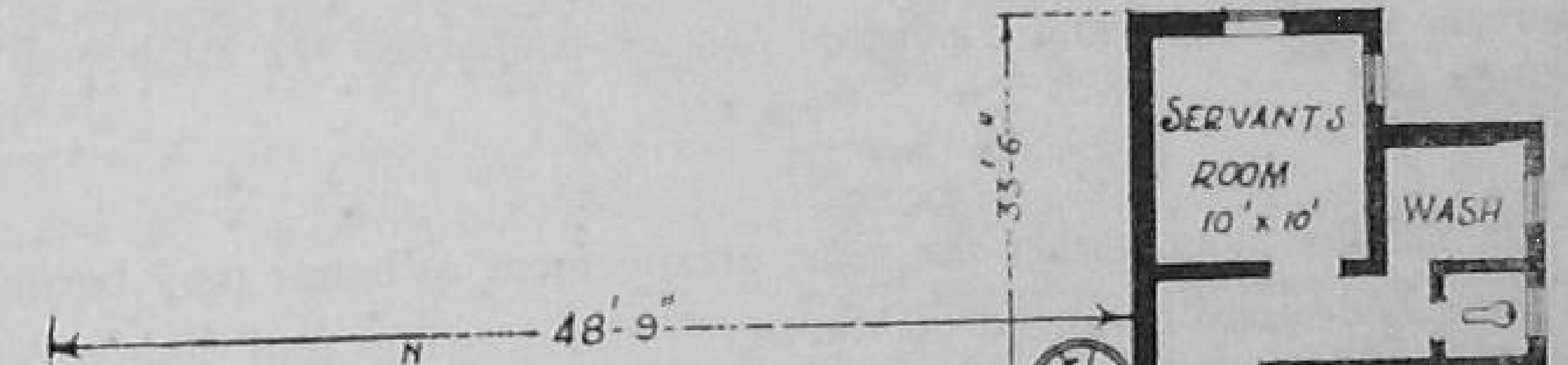


Fig. 288

Architects: SHAPOORJEE N. CHANDABHOY & Co., BOMBAY.

PLAN NO. 107

Floor Area: 7,380 sq. ft.

Pre-War Cost: Rs. 37,450

THE mansion featured here possesses in its exterior a nice blending of the traditional, as well as modern architecture. It faces north so that the porch lies on the east. A porch in front lends an air of dignity to the house. On one side of the entrance verandah is an easy, wide staircase, and in front a large drawing-room and dining-room of equal size. There is a six foot corridor arranged to separate bed-rooms on the right-hand side from the central rooms, which are meant for common use. A spacious verandah, full of glazed windows with a wide, semi-circular projection in the centre, should make an excellent lounge on the north side. All the bed-rooms are of ample size, and every one of them is provided with its own bath and toilet-room. Each bath-room has an entrance from the outside for a sweeper to serve. This makes the house suitable for the country-side also. There is a back verandah with a small servery in a corner, and a covered passage connecting the kitchen to the main building.

On the first floor, either the same arrangement as below may be made, or two more bed-rooms arranged on the top of the drawing- and dining-rooms, for which a common bath-room could be provided in place of the dispensing room. A cantilever gallery at the back is provided for the servants, to which an access from a spiral staircase may be given. The terraced roof over the front porch would be very enjoyable and could be used in common.

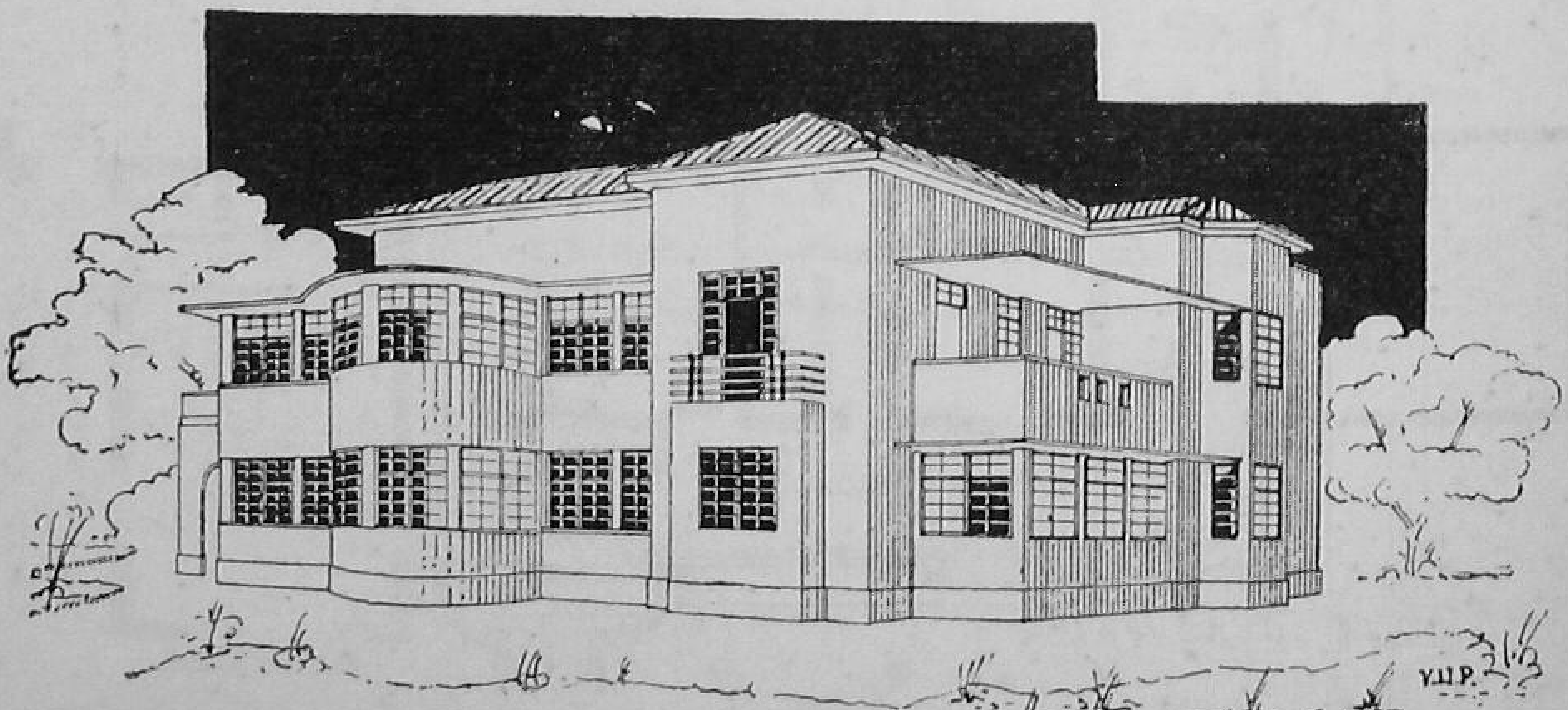
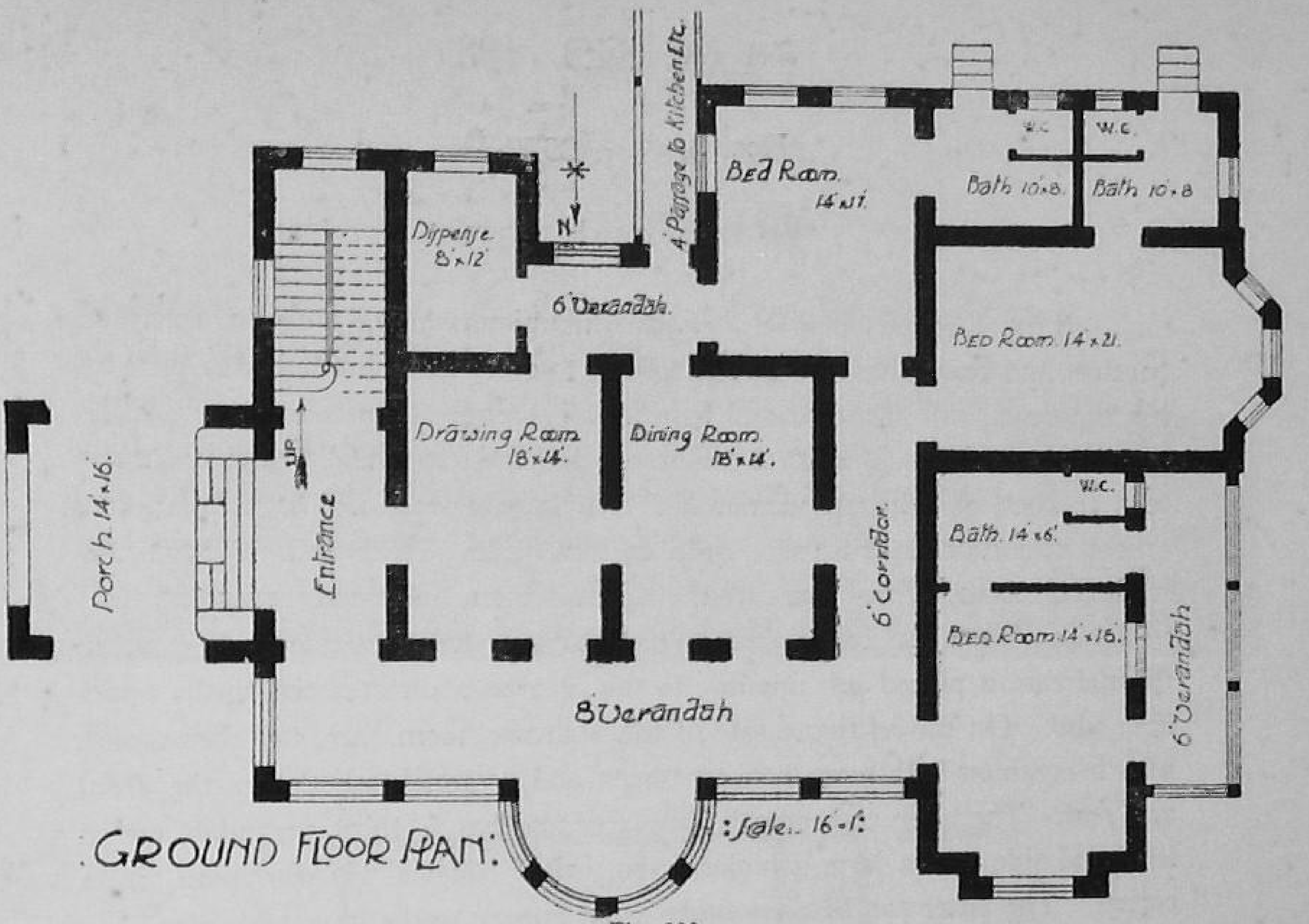
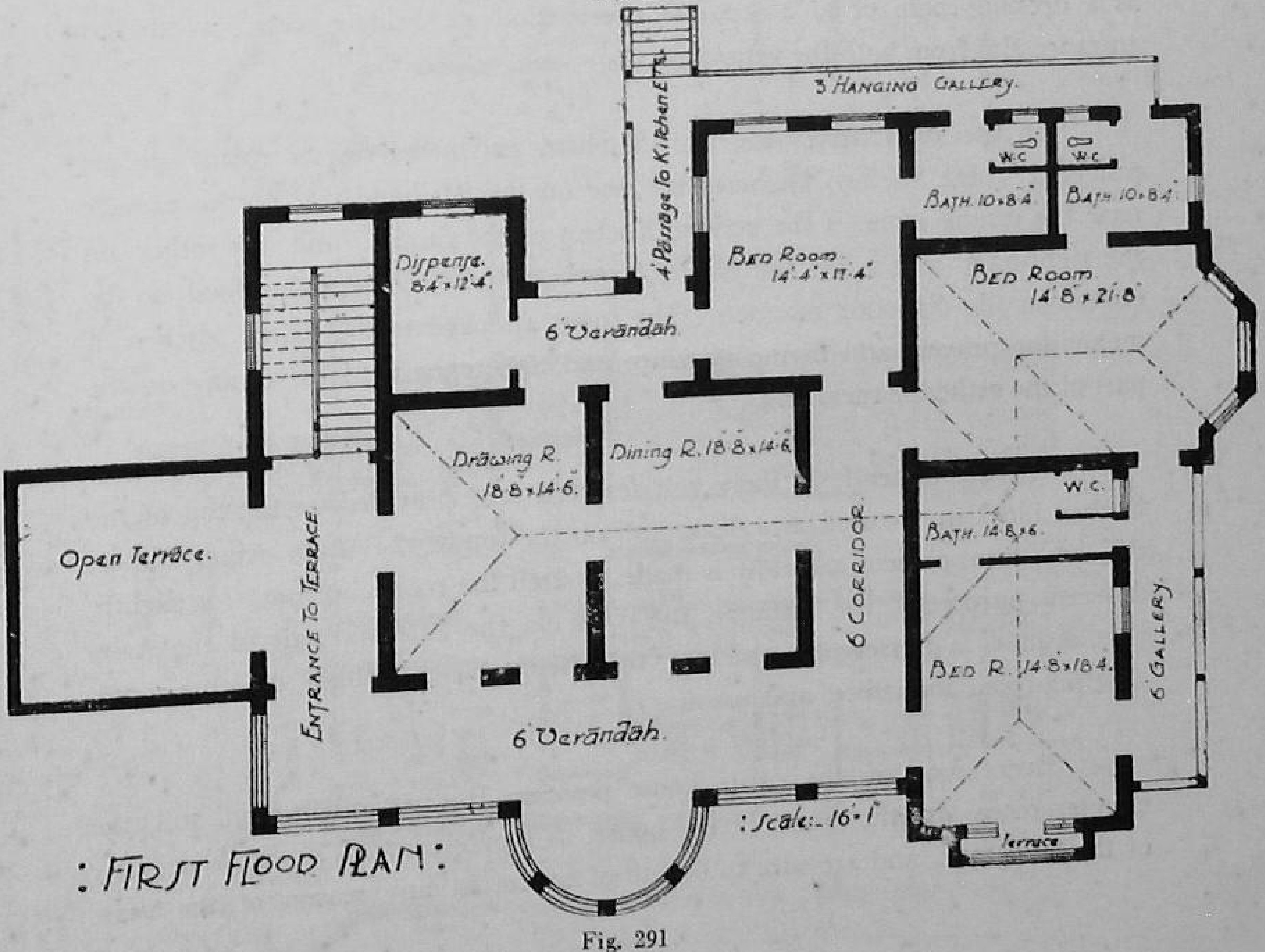


Fig. 289



: GROUND FLOOR PLAN :

Fig. 290



: FIRST FLOOD PLAN :

Fig. 291

PLAN NO. 108

Floor Area: 7,639 sq. ft.

Pre-War Cost: Rs. 37,200

This L-shaped plan of a modern mansion, which is designed solely for comfort and convenience, is sure to appeal to every rich family. Its main wing has the broad side facing the south-west. The entire house is one room thick, with an open verandah both on the front and the rear sides. It derives, therefore, the best of light and ventilation. The drawing-room is a large apartment on the extreme right-hand side, open on three sides. It is isolated from the remaining rooms of the house by the staircase room. The main front entrance to the house is in the corner of the verandah near the drawing-room, and as the staircase is placed just opposite to this, it gives a direct access to the upper floor also. On the left-hand side of the staircase room, are two bed-rooms, with a common bath-room between them, and verandahs, both on the front and rear. The main bed-room is very large and has a third verandah on its left-hand side and a large circular room, called "loggia" in the plan, in a corner. The latter can be used either as an annexe to the large bed-room—say as a dressing-room or as a separate observation or bridge room, as it has entrance also from both the verandahs.

In the short leg of the "L," kitchens and other service rooms are arranged. There are two kitchens, the one on the left-hand side of the passage near the dining-room, is the general kitchen of the family, and the other on the right-hand side is for the elderly members, who want their food to be cooked in the orthodox manner. The room attached to the latter kitchen is meant for prayers and divine worship, and also to be used for dining on the part of the orthodox members.

On the upper floor there is a terraced roof provided on the top of the kitchen block, to be used as a deck, and on the top of the main wing, almost the same arrangement as below is made, though the rooms are used for slightly different purposes. For instance, the room on the left-hand side of the staircase, is made a nursery for children, the one on the top of the drawing-room, a sitting-room for ladies, and so on.

Every room in the entire house possesses the best orientation, still, the circular rooms are the cream of the house, as they command a very wide view of the landscape, and are sure to be full of breeze in any season of the year.

Fig. 292

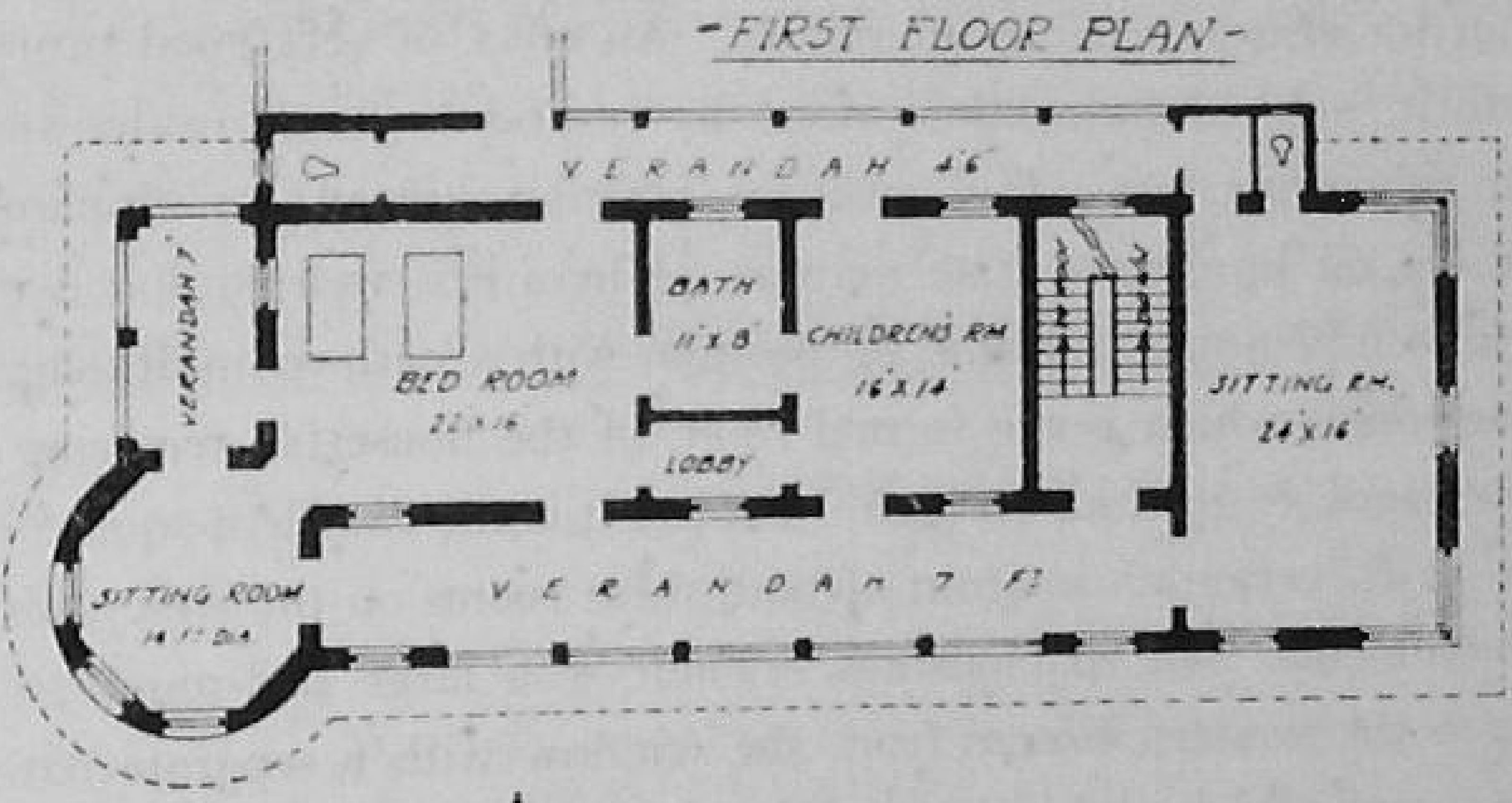


Fig. 293

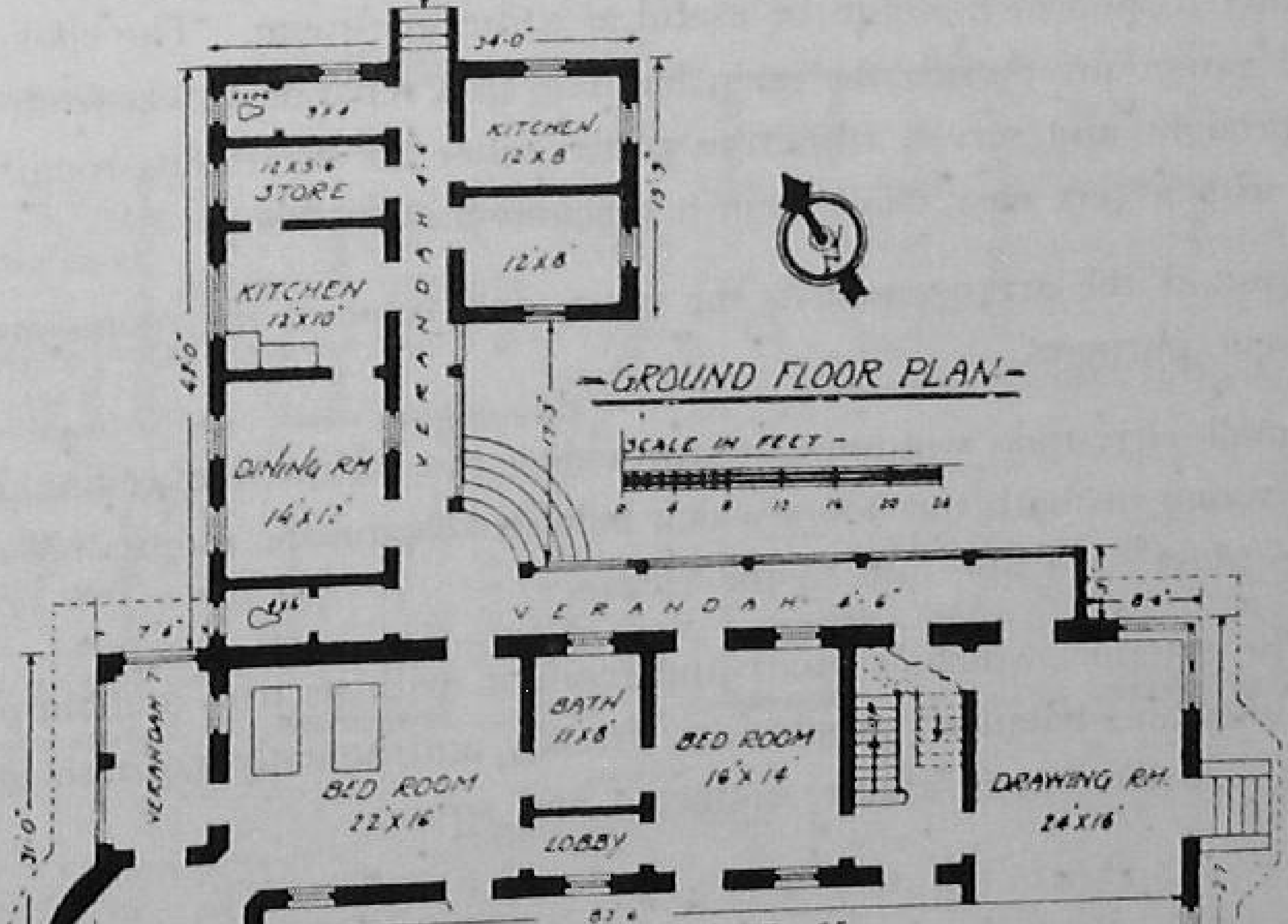


Fig. 294

Architects: MASTER, SATHE AND BHUTA, BOMBAY.

PLAN NO. 109

Plinth Area: 4,210 sq. ft.

Pre-War Cost of two floors: Rs. 42,000

THE charming home illustrated on the opposite page is designed and built on a rather pretentious scale for an officer of high rank. Convenience and spaciousness, befitting his dignity, rather than economy of space, have been the guiding principles in designing it. That is why there are verandahs on all the four sides, and much hall and passage space throughout for free circulation on both the floors.

There is a well proportioned excellent canopy to shelter a car on the east side, with an overhang of full 12 ft.—a feat of modern engineering. The official entrance is below it into a verandah, on the left-hand side of which there is a waiting-room for visitors seeking interviews. An office of very good proportions is opposite to it, isolated from other rooms by verandahs on two sides and hall-ways on the remaining two. It is an ideal position indeed for thinking and taking decisions on important state matters. There is a well equipped modern guest-room also in a quiet, undisturbed position with a bath-room attached to it. The drawing-room, which is the formal room of the house for receiving distinguished personages, is spacious enough. Behind it is the excellent square dining-room. The 12-ft. verandah in front of both these rooms on the west adds to the comfort, convenience and spaciousness. There is a large bed-room 16 ft. by 20 ft. open to the western breeze from the window with a separate bath-room and another room which would be useful as a dressing-room. The cook-house, store and garage are outside the main building in a separate block, from which food is brought and served from the pantry close to the dining-room. The staircase with a very easy climb is in a spacious hall.

Upstairs the arrangement is the same, only some of the rooms are used for different purposes.

Small clerestory windows are provided just below the ceiling in the principal rooms on both the floors which help in keeping the rooms cool on hot and sultry days, and also add to the elegance.

The exterior, which is smart and modern, with its trim and simple but graceful lines and balanced proportions, frankly and honestly expresses its true character—efficient, comfortable, enduring and strong.

Fig. 295

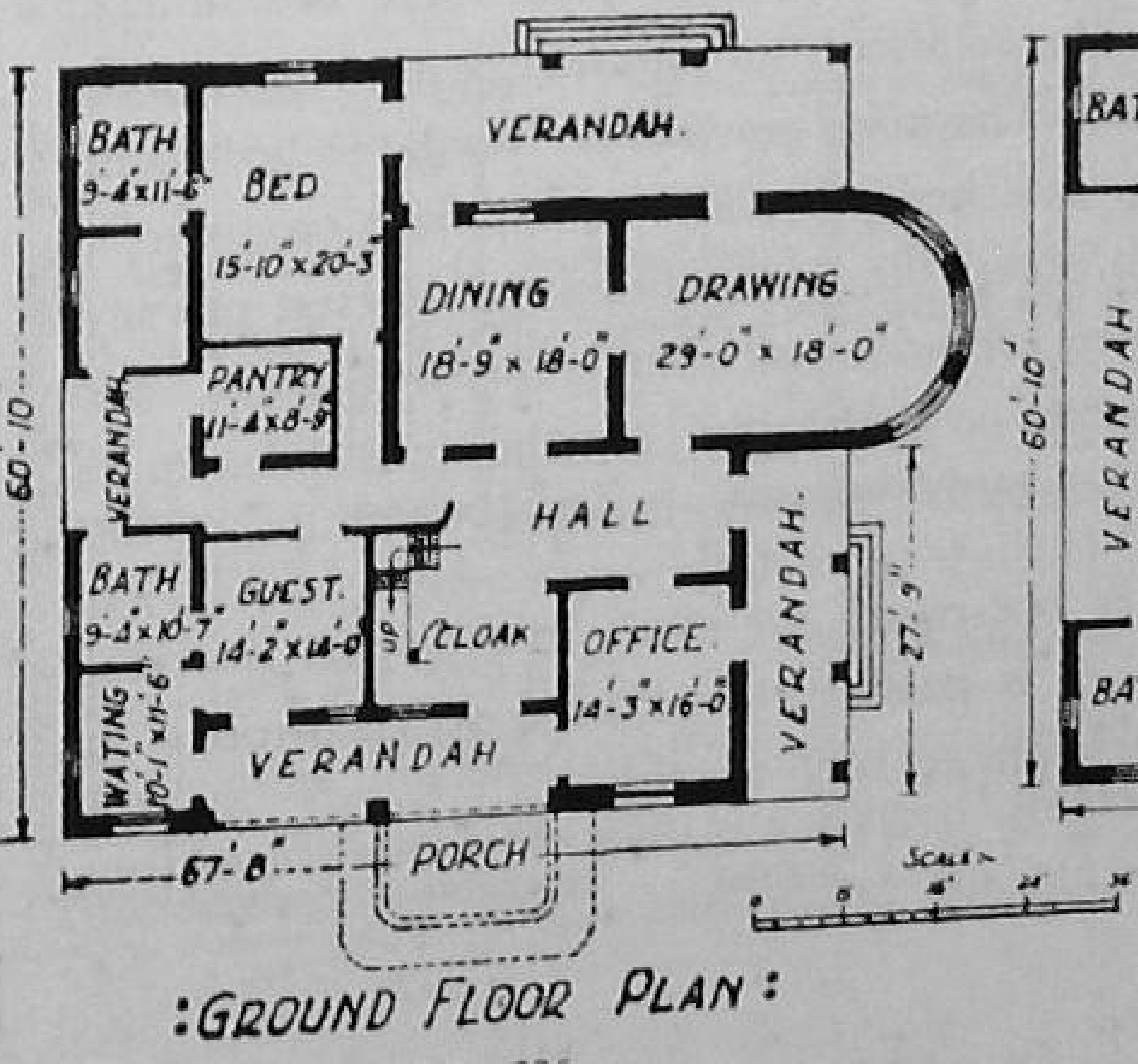


Fig. 296

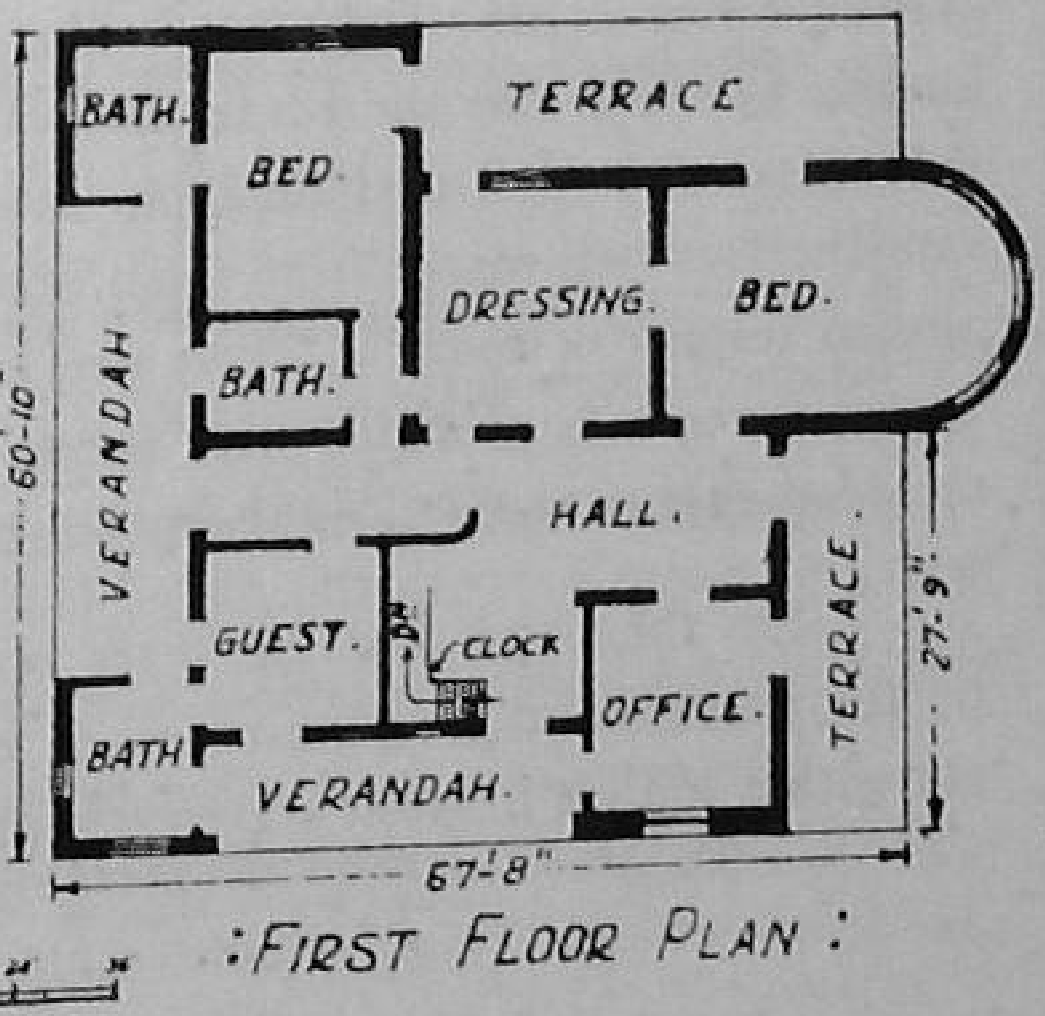


Fig. 297

Architect & Engineer: S. V. Puranik, B.E., A.M.I. Struct. E., A.M.I.C.E., Indore.

PLAN NO. 110

Area of two floors: 8,958 sq. ft.

Pre-War Cost: Rs. 45,000

THIS is another plan of a mansion, designed on modern lines with sole attention to the comfort and happiness of the family for whom it was intended. Rectangular in outline, unostentatious in concept, design and construction, it is one of the simplest plans imaginable and yet it provides all the amenities of modern, civilised life. The rounded corners, the bold horizontal lines of *chhajjahs*, the mass effect and very simple lines on the surface to break the monotony of the concentration of plain surface, give it the characteristic air of dignity and grandeur, which even the costliest and most elaborate ornamentation would certainly have failed to impart. There is also a most beautiful setting of an artistic landscape garden provided round the building, which enhances the exquisite charm of the home.

The entrance opens into a spacious lounge of 41′ × 18′, adequately lighted so as to avoid glare. A wide and luxurious staircase is placed conveniently in a corner of the lounge and lighted by the artistic corner window. Behind it is a dining-hall, spacious enough to fit into the generous scale of the entire design, with a pantry conveniently situated behind it. The kitchen and store-room are in a separate block attached to the pantry on the left-hand side, through which a passage is provided to reach the dining-room. The drawing-room also is in the front of the lounge, so that these three rooms form a block for common use. Separated from this block, there is a suite of private rooms on the right-hand side, to which an entrance is provided in the lounge, opening into the verandah. This suite consists of two large bed-rooms with a spacious private bath-room attached to each. As the bath-rooms separate the two bed-rooms from each other, the latter obtain the strictest privacy, also in respect of sound. There are verandahs all round the bed-rooms, and a prayer room is provided with access on both sides on the rear side, in a secluded corner so as to make it conducive to concentration.

On the upper floor, if three bed-rooms are made in the space provided by the dining- and drawing-rooms, it is possible to arrange six bed-rooms in all, with a lounge in front and verandahs on both the sides.

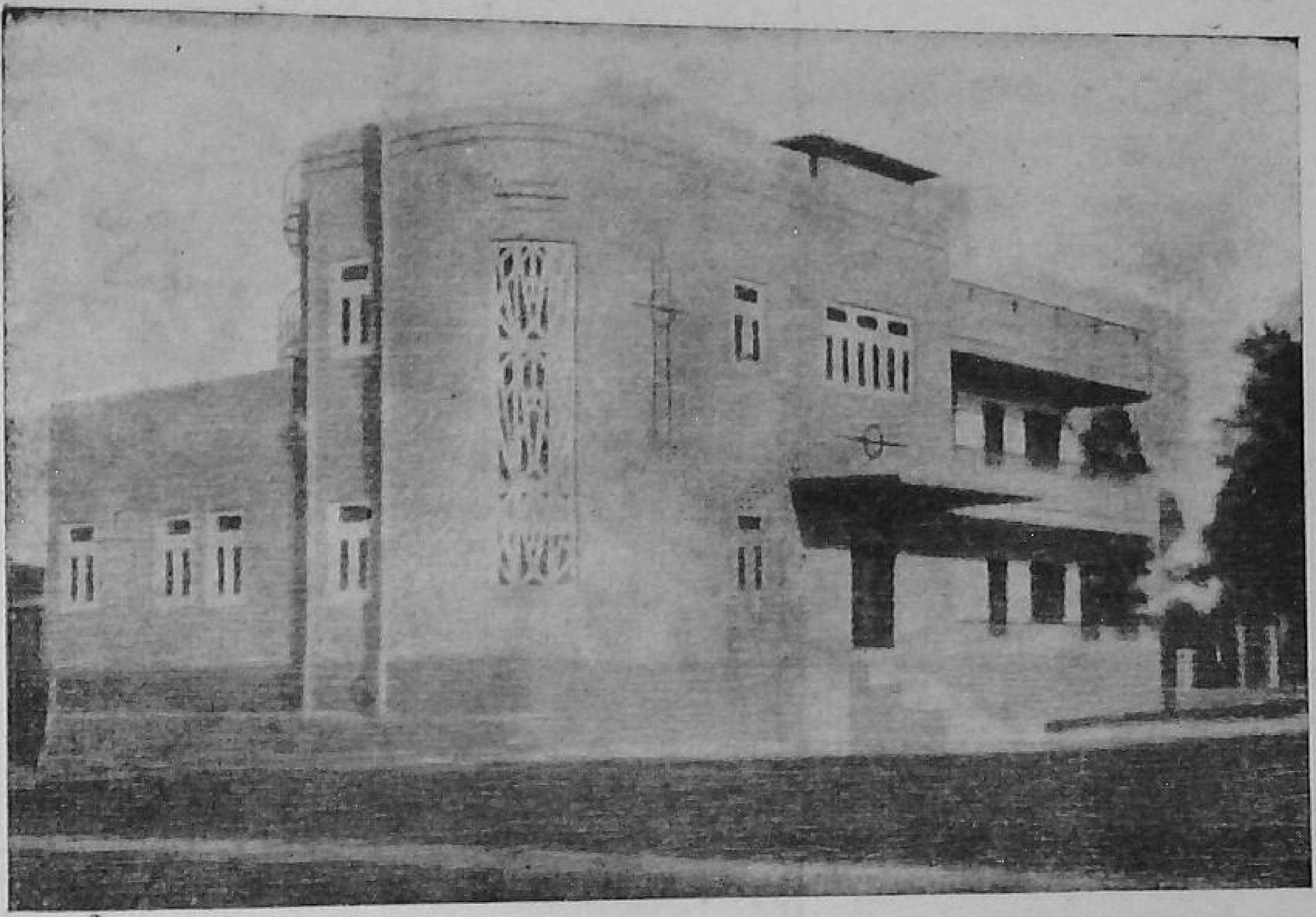


Fig. 298

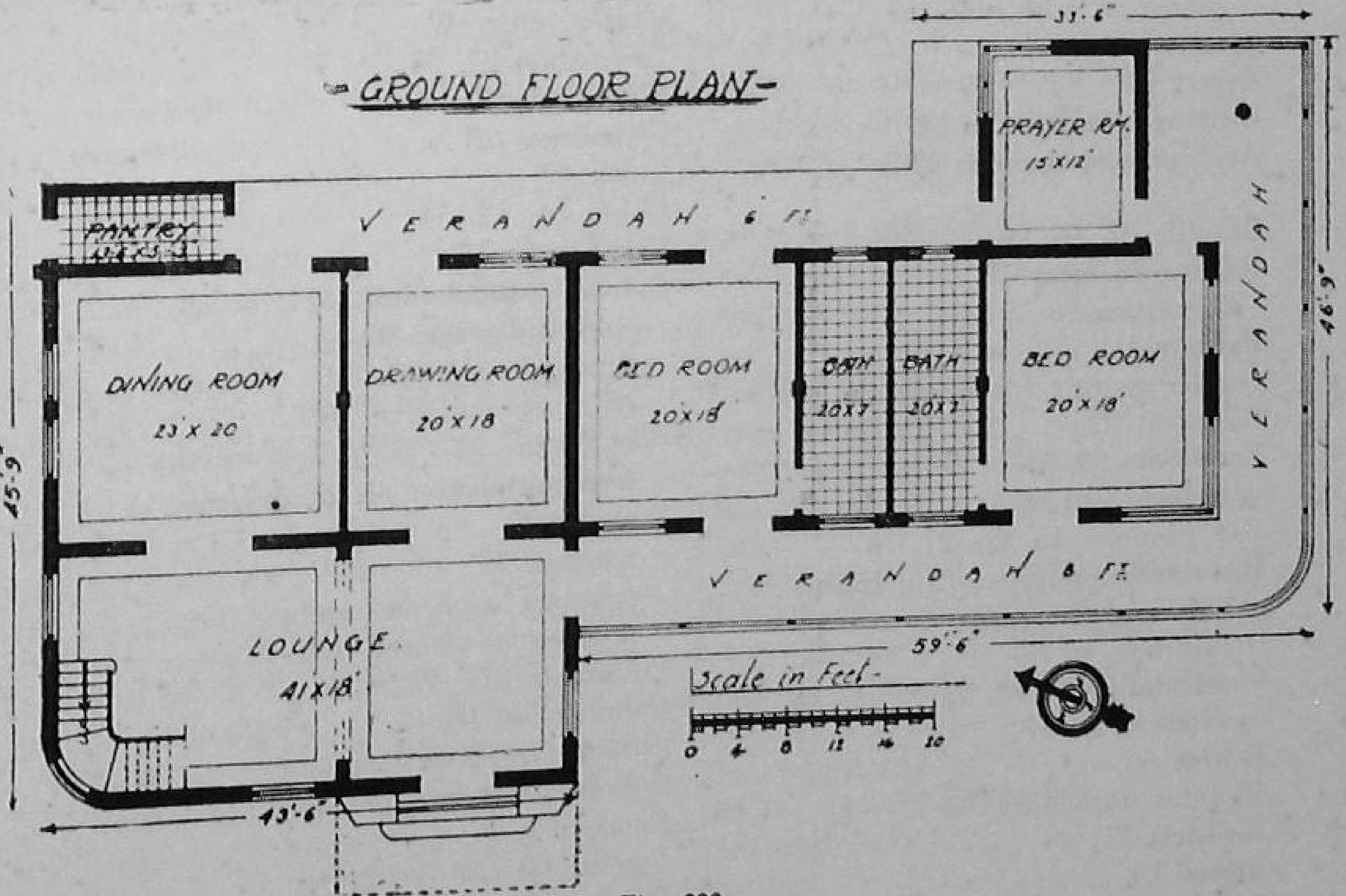


Fig. 299
Architects: Merwanjee Bana & Co., Bombay.

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